THE AUK:

A QUARTERLY JOURNAL OF

ORNITHOLOGY.

VOL. XXXI. APRIL, 1914. No. 2

AMONG THE BIRDS OF THE EASTERN SUDAN.

BY JOHN C. PHILLIPS.

Plate XIII.[1]

LOOKING back on our short collecting trip into the eastern part of the Sudan, the Blue-Nile basin, it is remarkable how strongly the first few days of the trip stand out in memory. The novelty of great spaces, of the groaning, toiling camels, of the burning noons and delicious nights, soon dissolves into an everyday existence, and one week becomes almost exactly like the next; so exactly, in fact, that after a month or more one ceases to remark on the weather and almost forgets he is living out of doors. A feeling rather steals over one that this is not the open air, but a great glass house, steam heated and weather proof.

Behold us then launched suddenly from the dusty train into the brilliant moonlight at Sennar. It was Christmas Eve, and all day long the train had been crawling away from Khartoum, over dusty durrah fields, at an average rate of just twelve miles an hour. Amidst great confusion we detrained our nine camels, giving three of them an opportunity to escape, which, camel like, they soon took advantage of.

In a large thorn enclosure we stowed away our luggage, made our beds and turned in. Supper was a brief affair that night. The full moon glared down upon us, a striped hyena gave his very

[1] Female *Caprimulgus eleanoræ* Phillips, three quarters natural size.

musical call, and from the sky above came the clamor of hundreds and it seemed thousands of European Cranes. Off in the distance was the confused sound of the village, donkeys, dogs and drums all jumbled together and softened into a weird sort of chant.

During the night we fought off the many hungry dogs, but not until they had stolen all our available lunch for the coming day. It was cold by 4:00 A. M., and we were out early, trying to warm up. At dawn we took our guns and strolled off into the great fields of durrah grain, then mostly harvested. For miles around Sennar there is hardly a tree left, the Blue-Nile flows drearily through a deep channel with high mud banks, with great sand bars and beaches at their bases. The current is swift and the water clear, coming as it does from the mountain region of Abyssinia, but by January this river is usually too low for steamboat navigation. Birds were about these fields in great numbers, but not of many kinds. First must come the cranes which winter all the way from Khartoum to Rosseires. They are mostly the Grey Crane of eastern Europe, *Megalornis grus grus*, but there are some of the smaller Demoiselle Cranes and a few African Crowned Cranes. No books had given us any idea of the enormous numbers of cranes on the Blue-Nile. It was by far the most notable bird sight of the region, and pleasing because unexpected. These cranes spend the night on the river sands in flocks of hundreds and always far away from any cover, so that they are perfectly safe. They feed inland mostly where there is cultivation and never seem to pass along the same flight lines. Their wariness is remarkable and it was pleasant to see such a safe retreat for these splendid fowl. I wondered why bird fanciers were made to pay ninety to one hundred and twenty-five dollars for a living pair, but no doubt on their breeding range they are scattered and hard to trap. By the end of February nearly all of these cranes had moved away from Sennar.

Other birds we saw that first morning were doves in endless numbers, their calls resounding in every direction. Here we obtained *Turtur isabellinus*, which we did not get again. Other turtle doves were very abundant, and the little long-tailed Cape Dove was seen everywhere, walking about the path in front of us, always very tame. This attractive bird is now imported alive

into America in large numbers. Shrikes of two kinds were common and a large blue hawk, *Melierax metabates*, was very conspicuous. This, the commonest large hawk of the country, is very sluggish and quite tame. Once, riding along a trail we passed one sitting in a low thorn tree, when to our astonishment he came crashing to the ground and lay there completely paralyzed. When we picked him up he offered no resistance and seemed perfectly limp, although he still grasped a freshly killed sparrow in his talons. On dissection we could find nothing diseased about this bird except possibly a small hemorrhage back of the ear. This was the first time we had ever seen a bird struck down from apparently natural causes, but he might have sustained a blow previously.

The most noticeable small birds around Sennar were Stone-chats, the common Isabelline Wheatear, a migrant, and the White Wagtail, also a wanderer.

We have delayed too long around Sennar and must get southwards, and can only pause to mention a few of the striking birds. The traveller up the Blue-Nile notices a fairly sudden entrance to the more African, or more tropical birds, though the bare scenery of leafless thorn forest is far from tropical in appearance. About El-Mesherat, or a little before, one gets into patches of dense bush near the river, with elephant grass, baobab trees, a few palms and here and there wild fig trees whose glorious foliage of dark green leaves gives the sun smitten traveller a dense shade all through the dry season. Hidden in these trees are the wary green Fruit Pigeons. Bird life, numerically at least, is remarkable in the bush about here. Dense swarms of plain colored Weaver Finches, mostly of two species and now of course in winter plumage, whirl about with a perfect roar of wings, looking like swarms of bees. No one can imagine the size or density of these flocks, which at first are really startling as they hurtle over one's head. We thought that one well directed shot would often kill a hundred. Imagine the feelings of an Arab when one of these flocks takes possession of his durrah patch, for it spells ruin in a short time. The children are all put to work with strings and movable scarecrows to frighten birds away, and they are kept busy all day long. The hanging nests of weaver finches are a conspicuous feature of the Sudan landscape, and sometimes a small thorn tree will hold twenty or thirty of them.

In the neighborhood of Karkoj and El Mesherat (latitude about 13 N.) we began to see Green Monkeys in the taller trees, and here and there the beautiful little Oribi, an antelope which will survive long after the great animals of the eastern Sudan have been crowded out. About in this latitude also, Hornbills of two species become common, though the small red-billed one, *Lophocerus hemprichi* is much the more plentiful. Prominent in the memory of those burning hot noons is the rising call of this bird, "Weet, weet," repeated till it reaches a crescendo, when the performer straightens up, opens his wings and bobs up and down. This is almost the only sound heard through the heat of the day, when bird life is hushed and the natives are fast asleep in their conical straw huts.

The large Brown Hornbill is a very different bird. He is wild, usually seen singly, and inhabits high trees where he emits a loud anvil-like note, at first single, then double, and accompanied by a flapping of the wings. There is another sort, the great Abyssinian Ground Hornbill, which is rare and we did not see it.

A shy and very beautiful bird of the Blue-Nile is the Red-breasted Bush-shrike, whose crimson underparts gleam through the thickets like a living flame. These birds have responsive notes, the male and female always combining in producing one call. I cannot do better than quote from Dr. G. M. Allen's notes on this subject. "Usually one bird gives a loud rich-toned whistle, "a-wheeo" the first syllable very faint; the other bird instantly replies with a harsh 'churr,' given either at the same instant, or following so closely that it is hard to distinguish the exact moment. Sometimes I have heard two different birds respond to a single bird whistling. More rarely the 'wheeo' is given in response to a call from the other, a harsh 'churr churr.' The two birds of a pair usually keep close together." Dr. Allen thought that the male gave the first note, the whistle.

As one gets south, parrots become much more plentiful. They are of two sorts. A long-tailed kind, the commoner, ranges pretty far north wherever there are large trees, and breeds high up in holes, even in January and February. They crack the nuts of the Laloab tree, a fruit much used by the antelopes and also very good to quench one's thirst. This parrot and its nearly related but larger Indian cousin are both seen breeding at large in the

zoological gardens in Cairo. The short tailed Meyer's Parrot with orange spots on the bend of the wings, is a small and very lively bird, exceedingly hard to collect, and only common in the southern part of our region.

It is hopeless to try to give any idea of the large number of species which we encountered in the two months, January and February, and a poor time of the year it was at best. In the way of game birds the Helmeted Guinea-fowl stands first, though in gameness he certainly stands at the foot of the list. This bird is seen all over the eastern Sudan, often in incredible numbers, and I can truthfully state that I encountered one flock containing a thousand head, a great bluish mass of moving fowl which ran ahead of me, occasionally rising by the hundred and alighting again. Flocks of a hundred or more were too common to be remarked upon. This species seems to live by sheer force of numbers, its stupidity is notorious, and it is preyed upon by all the small and very numerous carnivores, by the abundant hawks and by long lines of string nooses set by the Arabs. An English resident told me he had never seen its nest and A. L. Butler makes the same statement in 'The Ibis.' He thinks it must nest only in the rainy season, when travel is very difficult and the whole country is a sea of mud. In January, there were still some very young looking birds mixed in with these big flocks.

The francolin of the country is *Francolinus clappertoni*, a rather large and handsomely marked partridge which occurs mostly along the strips of heavy elephant grass near the river. In the morning it gets out onto the open edges of the grass and rises briskly and rather quietly, like a pheasant. It might make quite a good game bird, but its flesh, though white and fine looking, is rather a disappointment, for like that of the guinea fowl it is tough and dry. Perhaps if the birds could be hung in a cool place the result would be different.

The river birds of the Blue-Nile and its tributary the Dinder are not numerous, for there is very little food on the sandy, shifting shores. That patriarch of all birds, the Whale-headed Stork, or Shoe-bill is only found on the White Nile, and the great Goliath Heron we did not see at all, though it does occur in the eastern Sudan, more commonly perhaps in the summer season of flood.

The only common heron was a plain, grey looking species, *Ardea melanocephala*, which fed on insects in the great, open, damp "meres." These "meres" are a common feature on the Dinder River, where they attract great herds of game, holding as they do, water and succulent grasses till late in the dry season. With these herds of game enormous flocks of Little Egrets associate, and a lone old buffalo bull would often have a number perched on his back. The stomach of one of these Little Egrets contained lizards, locusts, and to our surprise, a butterfly.

We saw the curious Hammer-head Stork, an ugly and lonely looking bird quite often, and always by himself, and there was a Night Heron which we did not get.

The Egyptian Goose brings up thoughts of the departed great, for he figures so often on the tombs of the early dynasties as to have a real historical significance, while his egg had in those times a religious meaning. Apparently he was domesticated by the early Egyptians, but if so, this art was lost very long ago. Hayne, in his book on domestic animals, discusses this point and quotes St. Hilaire's account of an attempt in France to add this bird to our poultry. The attempt extended over a number of years, 1839 to 1845, and was partly successful, inasmuch as the birds increased in weight and grew lighter in color, while their breeding and laying time began to be extended. Nothing permanent, however, was accomplished and this species is now only an ornament and not a very desirable one either, for its temper is very uncertain and it is often dangerous in a collection of smaller water fowl. This goose exists at present in Egypt and on the Nubian Nile only in little scattered troops, while its great stronghold is the lower White-Nile. On the Blue-Nile we saw it in scattered pairs and little flocks. Its flesh is tough and dry.

There are scarcely any other water fowl on the Blue-Nile, except the curious Comb Ducks; but wading birds, mostly of common migratory species, are numerous. Among the resident shore birds the most attractive by far is the very common little Egyptian Courser, *Pluvianus ægyptius*. I think this is the prettiest shore bird I have ever seen, very tame, with flight like a Spotted Sandpiper, and the most beautifully marked and crested head, and a spotless chest crossed by a broad black band. This is the famous

"Crocodile-bird" of the Greeks, and in Arabic it is called the "Crocodile Watcher." It is doubtful whether this bird ever really feeds inside the crocodile's mouth. The sand bars are alive with these little fellows, and they feed busily around the very jaws of the huge reptiles with absolute unconcern. They are said to bury their eggs.

The common resident plovers are the African Thick-knee or Stone Plover, and the handsome Spur-winged Plover. These latter are conspicuous Lapwings with white faces, black breasts and black head caps.

We made a special point of collecting large numbers of nightjars and bats. As often as we had time we would take our guns at sunset and wander down near the river for the evening flight, when we were camped in a suitable spot. For the bats we tried to get an open piece of bare sand where we could find them in the dark, but for the nightjars we picked out open spots in the tall elephant grass. This was a delightful time of day. The glare of the afternoon was over, the last line of women and girls filed back to the village with waterjars gracefully poised on their heads, huge flocks of weaver birds were settling for the night, whirring down by thousands and disappearing in the tall grass with much chirping and rustling, the last doves were flying back after their evening drink, while the wind dropped steadily to the universal calm of the winter night. Every once in a while a flock of weavers would rise out of the grass with a dull roar, only to settle immediately, and often the first night-hawk of the evening would frighten them into a panic as he sailed over their roosting place. When it was almost dark the grass region would become alive with two species of nightjars, the long-tailed and the Egyptian. The numbers of these birds about Mangangani was really remarkable. The former has a single clucking note and is the commoner of the two. We often sprung it in the woods in parties of three or four in the daytime. It is a very handsome bird with a tail in the male ten or eleven inches long, a broad white bar across the primaries and another across the wing coverts. The female has a shorter tail. The Egyptian nightjar is a pale colored short-tailed species. The third kind is the famous standard winged species, in which the male has a pair of elongated raquet tipped primaries, reaching twenty-one inches in some cases. The

Arabic name "Abudjenah," or "The father of the four wings" well describes the appearance of the male in flight. Heuglin says that these ornamental plumes are at first perfect feathers, but by December the barbs on the basal part of the shaft begin to drop out. This process continues until April, when nothing is left but the bare shaft. In our specimen of February the shaft is bare except for the terminal two inches.

We found this species rare and very local. Each male seems to have a separate feeding range which he works night after night. They come out very early from the bush and cease their flight earlier in the night than the other kinds.

At Fazogli we were fortunate in securing an entirely new species which I called *Caprimulgus eleanoræ.* (Plate XIII.) It is a large, dark and finely marked nightjar, most nearly related to an Indian form, *C. monticola.* Africa is rich in *Caprimulgidæ* and there may remain a number of rare species still undiscovered.

I must omit most of the smaller birds in this account, but a few may be mentioned. We found a little colony of a plain-colored swallow at Fazogli, breeding in burrows dug in the ground. This bird, *Chelidon griseopyga,* is apparently rare, for Butler does not mention it in his various papers on Sudan birds, and the British Museum Catalogue only recorded three specimens. The burrows of these birds, which I cannot find have ever been noticed before, were some ten feet long and six to ten inches below the surface of the open plain. The nest of one we dug out was made of straw, and three feet from the blind end, containing partly fledged young on January 25. Whether this bird digs its own burrow in this hard baked loess is still an open question; but I think this probable. So far as I know, only one other swallow, *Hirundo pucheti* from the Congo, nests in this manner. Its burrows (Ornis 1885, p. 587) were supposed to be those of animals. They were three feet long and were found at an obtuse angle, the angle holding the nest and being at the deepest part.

We got four kinds of bee-eaters, one, the magnificent red-breasted *Merops nubicus,* is the most glorious of its kind. It is very large, with a long, pointed tail, habits like a swallow and a breast and back which seem to reflect the glory of the sunset. These birds were scarce till we reached the Dinder River, and we lamented our

inability to shoot one, for they flew very high and we never could find their roosts. One day Dr. Allen was riding along the road, mounted as usual on a small, gray donkey, his gun across the saddle-bow. A flock came flying over, the collector raised his gun, fired, replaced his gun, caught the bird in his lap, wrapped it up and dropped it into his bag, without the donkey ever changing his pace or wagging an ear. I call this a good performance, but as a game-shooting companion often remarks, "They do come easy, *sometimes.*"

I want to say a word about the indicators, or honey guides, which have caused so much comment from all African travellers. We found two kinds. The natives call them "Manóch" and treat them to a great deal of ceremony and a little set speech, the meaning of which we did not get. Most ornithologists concur, I think, in the belief that the honey guides do not guide, but merely attract one to honey by their presence in its neighborhood. There was one bird, however, at Mangangani, which persistently followed me about, and chattered in an amazing manner. I thought I never would shake him off, and I am almost convinced that he was following me and talking to me, too.

We got ten species of hawks, eight of thrushes, eleven of old world warblers, seven of shrikes and bush shrikes, and eleven of ploceids or weavers. Several of the ploceids are kinds seen commonly in cages. The long tailed Paradise Whydah, with rectrices that certainly impede its progress, and the beautiful little Cordon-blue of aviculturalists. This little gem of bright cobalt blue, so delicate and short-lived in captivity, was everywhere common, and associated in little flocks with the Small Red Weaver, *Lagonosticta senegala.* These little mixed flocks were most confiding, and we saw them everywhere.

The ostrich, which is rare, we did not get a sight of. It, with various species of cranes, storks, herons and the Giant Hornbill, is protected by law.

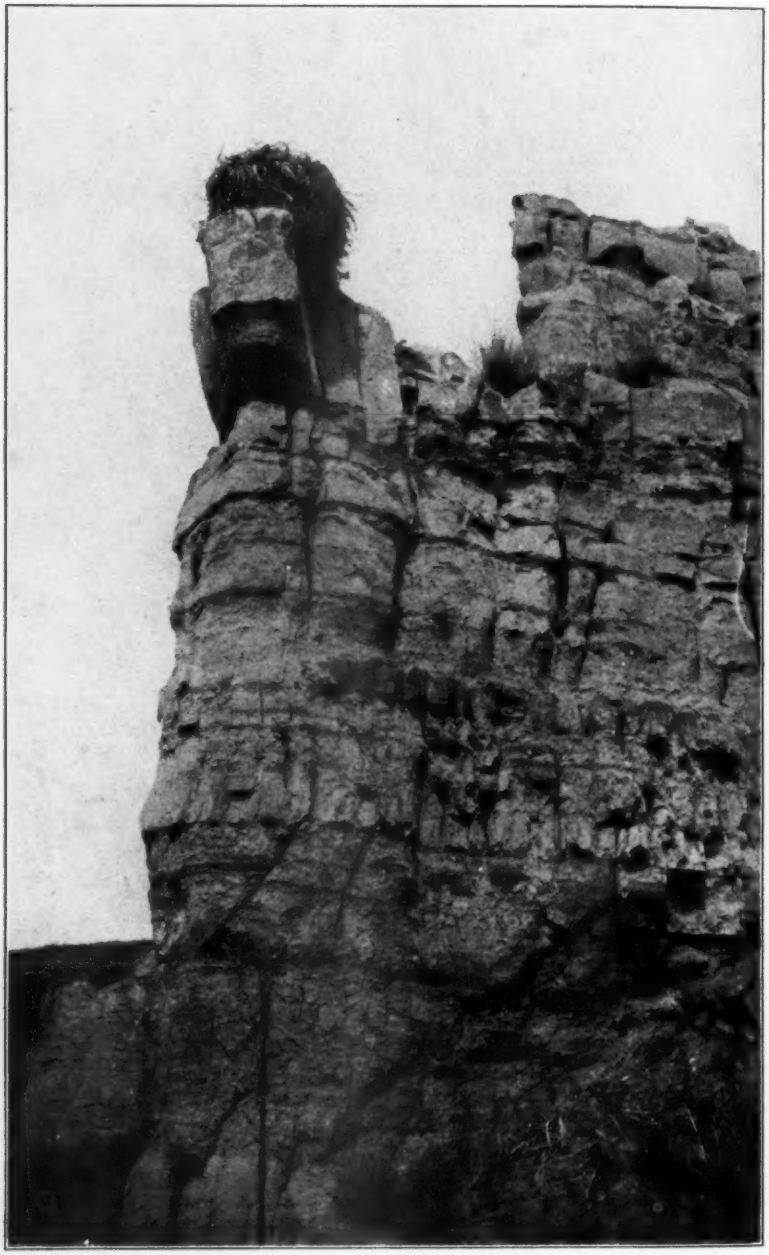
Most of the resident Blue-Nile birds belong to Abyssinian types, and are therefore different from the White-Nile forms only a short distance away. The mammals also tend towards Abyssinian, rather than central African forms.

Early workers in the eastern Sudan and Abyssinia were Rüppell

and von Heuglin, while of late years Reichenow, Neumann and others have done a great deal of systematic work. Mr. A. L. Butler, present Superintendent of Game Preservation at Khartoum, has given us interesting papers on Sudan birds since 1905. He is a keen observer, and has the interests of the great game and the birds very much at heart. He has been instrumental in many reforms such as limiting the slaughter of the sand-grouse near Khartoum, protecting the giraffe, etc. It is hoped that the Government will always be able to find such men, and that the policy of no arms for the Arabs and large sanctuaries for the game animals can be continued.

Were space sufficient, I should like to speak of many of the other groups. We had to leave just when some of the birds were beginning to assume their spring plumage and to sing. A little later the common weavers change from dull browns to orange, yellows and reds, and must be a gorgeous sight.

The Sudan has a curious attraction, and what it is no man can say, but as I look back I think of two pictures; one a crisp February morning breakfasting by candle light and watching the complaining camels as they are led in out of the still dusky thorn trees, while the first flights of cranes and weavers appear against a pale pink dawn. Next it is noon on a winding path amid the sweet smelling thorn bush. Nothing is heard but the tireless scuff-scuff of my camels' feet, on the dusty path, while hornbills flap from the branches as we pass, and the sun blares down through the leafless trees.



VIEW OF NEST NO. 1 OF THE FERRUGINOUS ROUGH-LEG. SHOWING GAP TO BE CROSSED.

THE FERRUGINOUS ROUGH-LEG, *ARCHIBUTEO FERRUGINEUS* IN MONTANA.

BY E. S. CAMERON.

Plates XIV–XVIII.

NESTING.

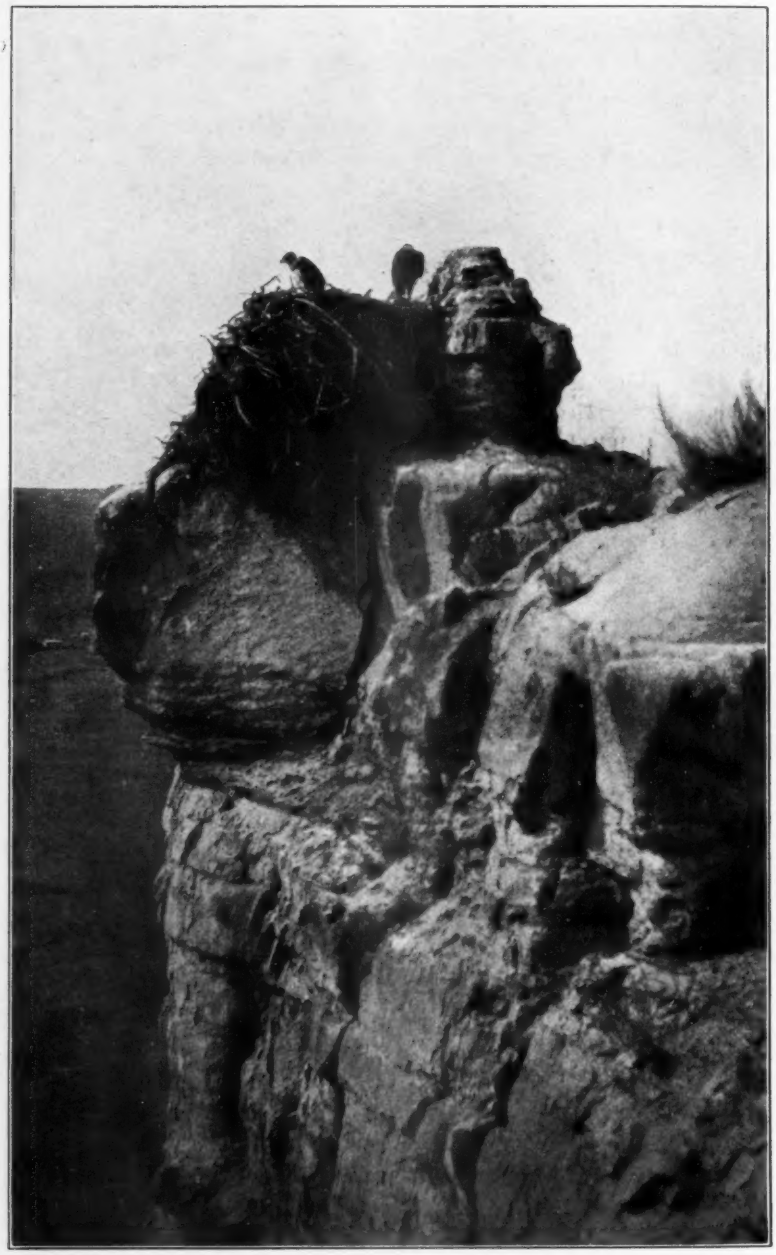
THIS splendid bird is undoubtedly the most powerful hawk met with in Montana, where it is usually called eagle, and its carrying power is remarkable as the sequel will show. It does no harm, but, on the contrary, wages unceasing warfare against such pests as prairie dogs (*Cynomys*), gophers (*Thomomys*), and meadow mice (*Arvicola*), and should therefore be universally protected; nevertheless it has unfortunately become very scarce, excepting in one or two favored localities where it is strictly preserved. Although a good deal has been written about the Ferruginous Rough-leg, as the hawk is called in the American Ornithologists' Union Check-list, I am not aware that it has hitherto been studied or photographed at the nest. It used to be abundant in Montana, as evidenced by the fact that Dr. J. A. Allen found it "next to *Falco sparverius*, the most common species of the Falconidae," and himself discovered several nests containing young. He continues: "The nest is often a very large bulky structure, sometimes three or four feet in diameter, built of coarse sticks, mixed with the ribs of antelopes and buffaloes. It is placed on the ground or rocks, usually near the summit of isolated buttes. The same nest is apparently occupied for a series of years and annually repaired."[1]

I have seen the eyrie of this species in many varied situations in Montana; such as trees, on pillars or ledges of rock, and the shoulders or summits of badland buttes. The female begins to lay at any time from the middle of April until the end of the first week in May, according to the season, and deposits two, three or

[1] Proceedings of the Boston Society of Natural History, Vol. XVII., June, 1874.

four handsome eggs of variable shade, but usually with rich blotches of umber brown on a creamy or greenish white ground. The eggs are half as large again as those of the Common American Buzzard *Buteo swainsoni*. The Ferruginous Rough-leg appears to incubate for about twenty-five days, but I have not been able to time her exactly. The young birds are full-fledged and leave the nest when about two months old but do not acquire the full adult plumage for four or five years. Their call for the parents is at first soft and low, (like the piping of young Golden Eagles), but develops into a pleasing whistle by the time they are ready to leave the nest. The hungry fledglings become very excited when they see one of their parents approaching, and have a parrot-like trick of working their heads and necks while snapping their beaks at the same time. If handled, they resent it with their bills as well as their feet, and, in my experience, are the only raptores to use the bill in defending themselves. The Ferruginous Rough-leg is very fond of standing upon one leg, keeping the other concealed among the feathers, and is so depicted by Ridgway in Fisher's 'Hawks and Owls of The United States.' As Dr. Fisher well remarks (op. cit. p. 92, 93), "When this hawk is hunting its flight appears labored and heavy, but when circling in the air its flight is graceful and resembles closely that of the Golden Eagle."

My own endeavors to observe Ferruginous Rough-legs at the nest were to a great extent frustrated by outside interference. In 1899, a pair nested upon the apex of a badland butte near my ranch, and the female was sitting hard upon two eggs during the first week in May. The nest appeared to be in an unfavorable situation, exposed to every wind, was lined with dried grass, and composed of sage brush stalks, creeping cedar, and cedar drift-wood sticks. The latter were the largest sticks I have ever seen used in any nest, not excepting eyries of the Golden Eagle. Unfortunately, a road wound by the nesting site, and the hawk was wantonly killed before she had succeeded in hatching her nestlings. She might easily have escaped when first startled from the nest, but was unwilling to forsake her eggs, and flew screaming in circles above them until she was shot. The victim was a fully adult female, and in life must have been a truly magnificent bird. Her tail was entirely snow-white except for a few small streaks of bright chestnut, and



ANOTHER VIEW OF NEST NO. 1 WITH NESTLINGS.

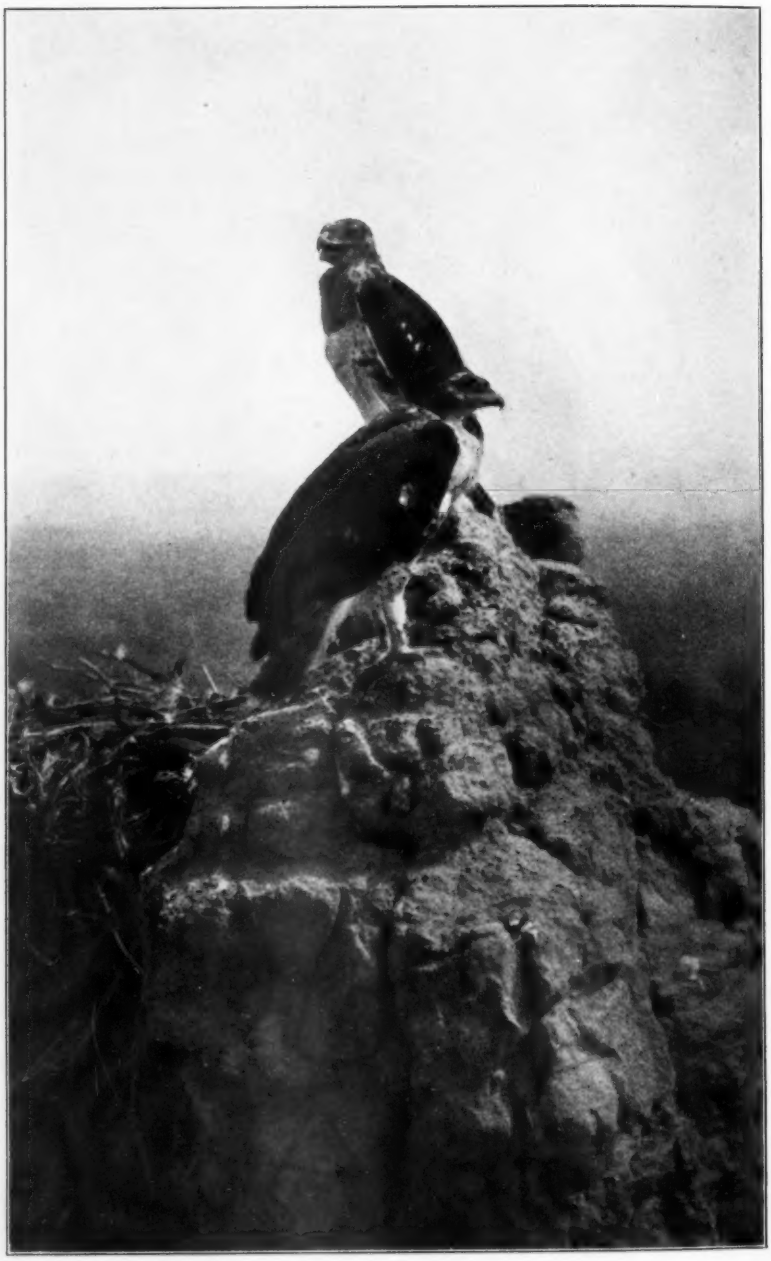
her legs and 'flags' were of the latter color barred with black. To the casual observer, the color of these parts will mark the chief difference between adult and immature birds. In first and second plumage, at least, the legs and thighs are of such pale buff as to appear white excepting in brilliant sunshine. Moreover, the tail of the young bird has four dark bars and is white for the basal half only, the terminal half being light slate color.

In May, 1905, a second pair of hawks constructed an eyrie in a cotton-wood tree about six miles from my Dawson County ranch. A shepherd who happened to camp with his sheep wagon at this place boiled and ate the three eggs, whereupon the disgusted birds deserted it. Yet a third pair nested upon a ledge of a high butte during 1908, when two eggs were laid, but the almost full-fledged young were discovered by some sheep shearers in July, who killed one and took the other captive. From three nests, therefore, no young birds were reared, and one adult was inexcusably sacrificed.

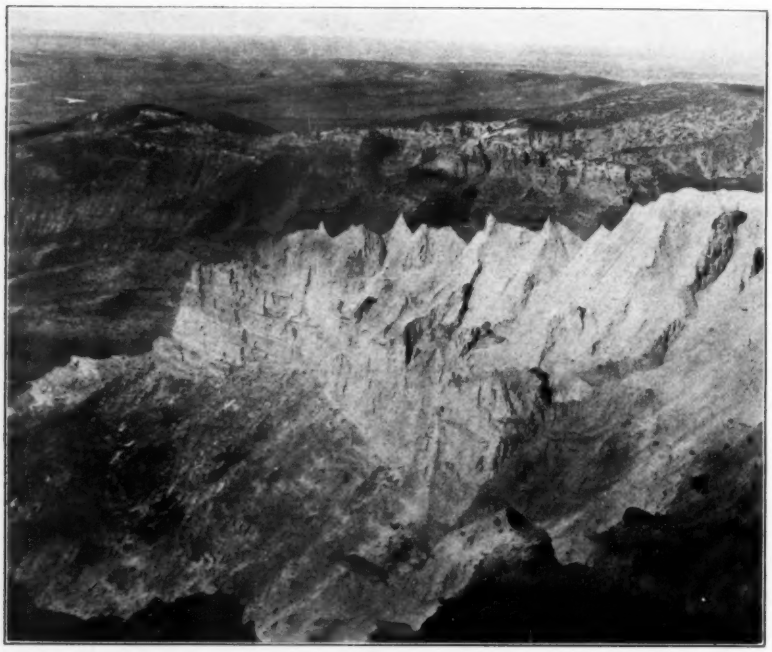
Last summer, Mr. W. R. Felton, an engineer of the Chicago, Milwaukee and Puget Sound Railway kept four nests of this hawk under observation for me, and visited them whenever his work of building a branch line between Lewiston and Great Falls allowed him time. These four nests were within a radius of four miles from the engineer's headquarters at the Square Butte Ranch, in Chouteau County, and others were reported seven miles away. Besides the above, Mr. Felton found four disused but well preserved eyries,— two of them within a quarter of a mile of an occupied nest. All eight nests were placed upon rocky ledges or points. They were constructed of the same materials, which consisted of sage brush and greasewood sticks, with some soapwood intermixed, and lined with dry cow manure. As will be seen from the measurements, the loose pile of sticks made the new nests remarkably high, but they settled considerably before the young had flown. A brief history of the four nests and their occupants condensed from Mr. Felton's notes follows: Nest No. 1, which was only two miles north of the Square Butte Ranch, and easily visible from there through powerful binoculars, was visited almost every day. This particular nest was picturesquely situated on a rocky point of the 'Chalk Cliffs' northeast of the geologically famous "Square Butte,"

which despite its modest name is an immense laccolith constituting an isolated spur of the Highwood mountains,— 2600 feet above the prairie. In reality the so called 'Chalk Cliffs' consist of an outcrop of white sandstone, chiefly in the centre of a range of grass-covered hills whose green summits rise in strong contrast above the white corrugated rocks. This sandstone stratum has been worn into a series of perpendicular cliffs, pure white above, but stained light brown below by lignitic matter and projecting spurs are carved into fantastic pinnacles and mounds. One promontory in particular is a regular sawtooth ridge. The nest here shown is poised upon the apex of a pillar which terminates a knife blade projection of 3537 feet elevation, and suggests in some photographs the prow of a ship. As there is a sheer vertical descent on three sides, and the surface of the connecting ridge suddenly breaks off leaving a wide fissure in the rock between it and the nest it is a task of no small difficulty to reach the latter and one best suited to a sailor or a cat. It can only be accomplished by approaching the eyrie from above, and then crawling along the ledge, when by dropping into and crossing the gap, which is well shown in the photograph, the nest can be attained. Mr. Felton, making light of the danger, climbed frequently to the nest, and made numerous exposures with a small Kodak, at the range of a few feet. The nest was four feet in height, and three and a half feet in diameter, and was higher than any Montana eyries of the Golden Eagle (*Aquila chrysaëtos*) known to me, which species had also nested in the 'Chalk Cliffs.'[1] The hawks carried green alfalfa to the nest for decorative purposes, and Mr. Felton noticed a fresh supply there on three separate occasions. When found on May 18, the eyrie contained three newly hatched young, but only two reached maturity, as one of the nestlings disappeared on July 9, when fifty-two days old. Mr. Felton conjectured that it had been blown out of the nest by a violent thunder storm, but the two stronger birds might have ejected their weaker brother. In any event, the outcast would soon have been picked up by some four footed or winged marauder. The two remaining fledglings permanently

[1] In his recently published 'History of The Birds of Colorado,' Mr. W. L. Sclater mentioned (p. 182) a Golden Eagle's nest which measured 'six feet in diameter and nine feet high.'



YOUNG FERRUGINOUS ROUGH-LEGS BEFORE THEY COULD FLY.



1. A SAWTOOTH RIDGE AT NESTING SITE OF FERRUGINOUS ROUGH-LEG.
2. NESTLINGS OF FERRUGINOUS ROUGH-LEG.

left their nest on July 25, when about nine weeks old. While watching at this nest at 2 o'clock in the afternoon, Mr. Felton observed a Great Horned Owl flying along the cliff face in an easterly direction. The owl passed close to the nestlings, when one of the soaring hawks, presumably the female, was seen to swoop at, and strike the interloper, which thereupon dived obliquely to the ground. The hawk made two more dashes at the sitting owl, and a short squabble ensued each time between the birds, but when Mr. Felton reached the place the owl was nowhere to be seen and the hawk had returned to her nestlings. As the Great Horned Owl is a powerful and ferocious bird, which even attacks and eats large hawks (see Fisher, 'Hawks and Owls of the United States,' p. 175), it undoubtedly beat off its assailant without difficulty.

A second eyrie was also placed in the 'Chalk Cliffs,' in a similar situation, a mile to the east of the one above mentioned. This nest, which was two feet high and three feet in diameter, contained three eggs, one of which proved infertile. As in the case of the first eyrie described, a three weeks old nestling was evicted from its home on June 31, to fall fifty yards below on the steep hillside where it was found and restored to its nest by Mr. Felton. Its preserver had the satisfaction of witnessing the first flight of both birds on July 12. They were noticed to be very much on the alert, and Mr. Felton, desiring to obtain a photograph, crawled cautiously from above to within five yards of the nest. As he raised his Kodak both hawks took alarm, and boldly launched themselves from the eyrie in the direction of the creek below. After holding a straight course for about a quarter mile the fledglings seemed to lose heart; they circled right and left, and, again meeting, returned together to the cliff. So far their graceful flight had been marked with almost adult ease; but both betrayed inexperience when trying to alight and capsized awkwardly upon the ledge. Near this place a curious, unused eyrie of the Ferruginous Hawk was fixed against the vertical wall, to all appearance like a Cliff Swallow's nest, but the heavy structure was in fact supported by an invisible ledge.

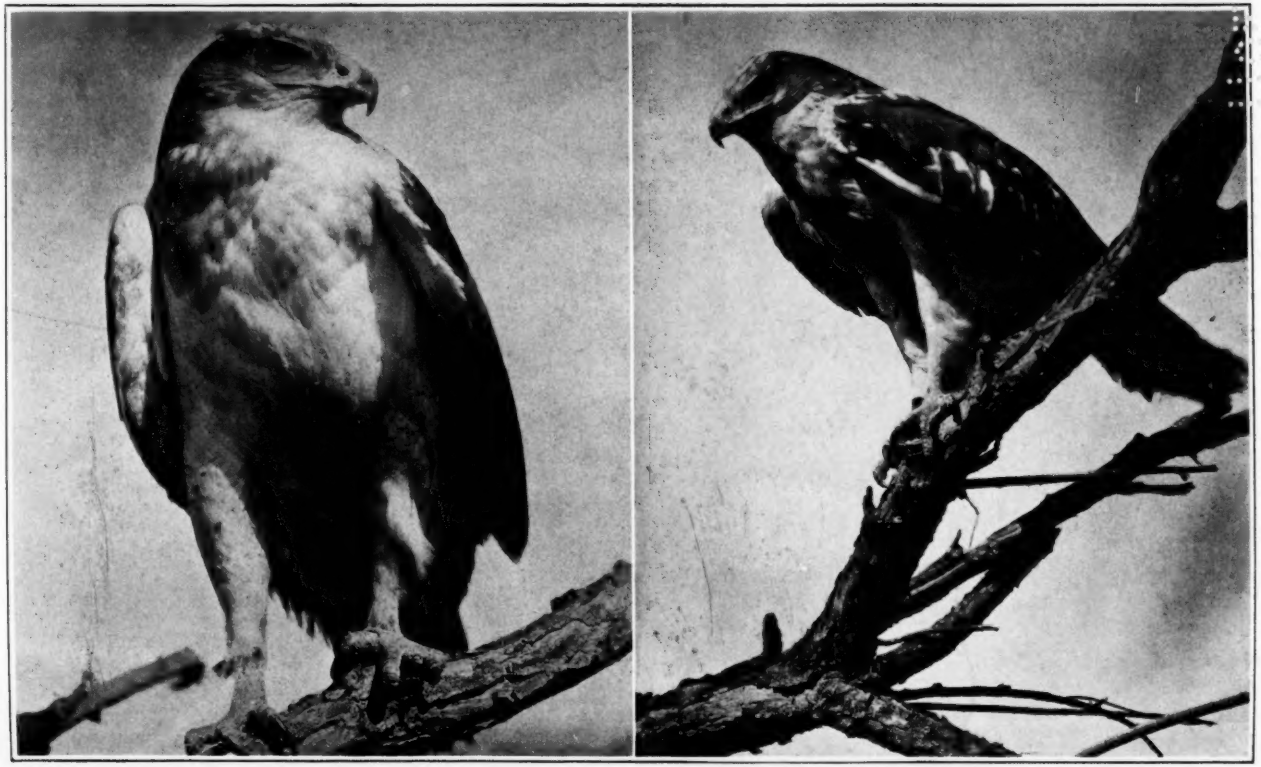
No. 3 eyrie was situated in the Surprise Creek brakes, and built upon a conical gumbo point which terminated a knife blade ridge some thirty-three yards below the bench above. From this nest there was a sheer fifty feet drop in front and at both sides. It was

a large straggling edifice, three feet high and the same in diameter at the most compact part. Near this eyrie were the four unoccupied nests above mentioned. When Mr. Felton first discovered this nest, on May 18, the female hawk was incubating four eggs, and the young birds of about a week old were found on June 6. At about a month old the nestlings were taken for pets by some Swede railroad contractors, greatly to the annoyance of the engineer, who desired that as many as possible of his protégés should be safely fledged. The young hawks were allowed full liberty in the contractor's camp and would fly away in the morning and return at night, but on July 28 they disappeared altogether. According to Mr. Felton's observations and my own the Ferruginous Hawk develops its flying powers very quickly, and I have known a two months old female of this species to take flights of from two hundred to three hundred yards without a wind. As with the genera *Aquila* and *Buteo*, the male is a week later than the female in acquiring the full power of flight.

The fourth eyrie, which contained four eggs, was placed upon the summit of a sand rock among pines, and here four birds were reared, which, as observed by Mr. Felton, took flight on July 17. This nest was not measured until the day of the final departure of its occupants, when it had settled so much as to be only a foot and a half high, although three and a half feet in diameter.

FOOD.

So far as I have been able to observe in Eastern Montana, the Ferruginous Rough-leg feeds chiefly upon prairie dogs and meadow-mice, though not averse to snakes. In my opinion it never takes frogs. Like Golden Eagles, these hawks often hunt amicably in pairs, and then appear to be more courageous, attacking mammals as large as jack-rabbits. On July 29, 1907, Mr. Lance Irvine, foreman of the Crown W. Ranch in Custer County, Montana, when out riding, surprised a pair of Ferruginous Rough-legs with a freshly killed jack-rabbit, which weighed about eight pounds, and could not therefore be carried away. From the description this pair would consist of a bird of the year with one of its parents. On



1. FULL FLEDGED FERRUGINOUS ROUGH-LEG, ABOUT SEVEN WEEKS OLD.
2. FEMALE FERRUGINOUS ROUGH-LEG NINE WEEKS OLD.

May 28, 1893, my wife and I witnessed the capture of a prairie dog by two of these hawks, and one of them was proceeding to devour it as we rode up. The methods of the crafty coyote and the Ferruginous Rough-leg are identical in 'dog-towns.' Both wait patiently; the hawk also on the ground, for a prairie dog to amble afield from its burrow, and thereupon make a dash, the first terrestrial, the latter aerial, to intercept it. A prairie dog always endeavors to gain its own burrow when danger threatens, and is marvellously quick to reach it, but if cut off from home, the beast becomes so bewildered that it neglects the nearer intermediate holes. When two coyotes, or two hawks hunt together, the fate of the intended victim is sealed, but with one assailant only, it has an even chance.

Mr. W. R. Felton made many valuable observations on the food habits of these hawks during the nesting season, and discovered the fact, new to science, that they prey upon birds as well as on mammals. Over the whole course of his observations until the young birds had flown, prairie dogs were found to largely exceed all other diet, but until the nestlings were about two weeks old their food consisted partly of Meadowlarks (*Sturnella neglecta*). While very little food was found in nest No. 1, taking into consideration the frequent visits paid to it, there were seen altogether: nine prairie dogs, one cotton-tail rabbit, two bull snakes, one thirty-one inches long, and some remains of Sharp-tailed Grouse and Meadowlarks. On two separate occasions, while Mr. Felton kept watch near this eyrie, the wary female frequently passed and repassed overhead with a Meadowlark in her talons, as subsequently identified. The bill of fare at all four eyries was similar, and Meadowlarks, as demonstrated by their down and feathers, were provided for the nestlings. The following interesting collection of remnants was seen at No. 4 nest. Four prairie dog skulls, the skeletons of two bull snakes, one of them being very large, the leg of a Sharp-tailed Grouse, the wing and scapulars of a Magpie, and the primaries of a Meadowlark. Grouse and Magpie remains were not found until July 17 and 21, and were proved by the feathers to belong to young birds, although I do not doubt that a Ferruginous Rough-leg would be quite capable of capturing an adult sitting grouse. When I was standing below the nest designated No. 1, on October 13, 1912, three Magpies alighted by it.

To the best of my knowledge this species never attempts to take poultry of any kind, and my own observations are strongly confirmed by Mr. W. P. Sullivan, for sixteen years manager of Mr. Milner's beautiful Square Butte Ranch, where these hawks have always been protected on account of the numerous gophers (*Thomomys*) which they destroy. As above narrated, several pair breed annually upon the ranch, and are constantly flying around the buildings, yet no chickens have ever been molested. Mr. Sullivan, who is a close observer of nature, considers that, after the young are flown in the fall, these hawks subsist chiefly upon gophers, and he has described to me (in lit.) their method of capturing them as follows:—

"I have watched the hawks often through glasses in our alfalfa field after the first crop has been taken off. The pocket gophers get pretty busy tunnelling, and pushing all the loose, damp earth up in piles on the surface. The hawks fly slowly over the field until they discover a fresh pile of damp earth. Here they will alight softly, and wait for the gopher to push close to the surface. They will then spread their wings, and, rising a few feet in the air, come down stiff-legged into the loose earth when the gopher is transfixed and brought out. I have seen them eat the gopher where caught, and at other times carry it away."

In the summer of 1903, about an acre of ground at the Square Butte Ranch was covered with piles of building material, such as lumber, posts, and heavy shed timbers which had been collected there the previous year. Numbers of cotton-tail rabbits lived under these piles, and provided an occasional meal both for the hawks and for the ranch cat, which was a female tabby. On a certain day Mr. Milner, owner of the ranch, happened to be engaged in conversation with Mr. Sullivan near a pile of posts upon which the cat was basking in the sun with one eye open for a chance rabbit as usual. A Ferruginous Rough-leg, with nestlings in the white cliffs, was gyrating low over the buildings, but neither the gentlemen nor the cat took particular notice of this familiar sight. Both men were, however, startled by a loud whirring noise, when to their intense surprise they saw that the hawk had lifted the now bewildered and struggling cat from her couch on the posts and was slowly bearing her aloft. It seemed at first to the astonished

spectators as though the hawk would actually succeed in disposing of this troublesome quarry, since it continued to rise easily with its burden to a height of about twenty-five feet. By this time however the fully aroused victim was stirred to a desperate effort, and it became clear that the audacious hawk had 'bitten off more than it could chew.' In Mr. Sullivan's words the tabby "twisted around, gave a terrible splutter and scream and clawed the hawk with a vengeance." The latter, flapping wildly, at once relaxed its grip, while pussy nothing loath, withdrew her claws, fell to the ground, and dashed under the posts. Numerous downy feathers, floating gently to the ground convinced the onlookers that the chagrined hawk had none the best of the encounter. Temporarily tired of cats, it now soared to a great height and returned with empty talons to the chalk cliffs. The cat in question was a very small one, and Montana cats are notably thin in summer; but, allowing for these facts, the victim must have weighed six pounds at least. Nevertheless, Mr. Sullivan feels sure that, had the cat behaved like the rabbit for which she was mistaken, the hawk would successfully have conveyed the quarry to its eyrie in the rocks. As the nest was two miles distant this would seem an extraordinary feat, and presumably transcend any hitherto published records of the kind. I quite admit that under favorable conditions of wind the female hawk might transport a five or six pound jack-rabbit to the eyrie; but that any cat-lifting hawk should ever surpass what this one achieved seems to me improbable. The dexterous application of the cat's raking claws would not fail to prevent it, as in the above remarkable instance.

Where a rabbit succumbs to the shock of the hawk's constricting grip, the agile and wiry feline, on the other hand, is stimulated to offer a desperate resistance, and like Mr. Sullivan's protégé is little the worse for the encounter. It cannot be told whether the hawk was mistrustful of rabbits after this event, but the cat became so suspicious of a flying object that she would race for the wood-pile if Mr. Sullivan threw his hat into the air.

BIRDS AS DESTROYERS OF GRASSHOPPERS IN CALIFORNIA.

BY HAROLD C. BRYANT.

CONSIDERABLE evidence of the interrelations existing between bird and insect life has come to light in connection with investigations into the economic status of certain birds carried on under the auspices of the California State Fish and Game Commission and the University of California. Some of the best evidence came from an investigation of a grasshopper outbreak in the vicinity of Los Banos, Merced County, California. A part of the results of this investigation was published in the University of California 'Publications in Zoology,' volume 11, pages 1–20. In the present paper additional matter is combined with a part of that previously presented, the whole being now offered with a special view to the problem of insect destruction by birds in California.

Certain sections of California are annually troubled with grasshoppers, and there is seldom a year when they do not cause considerable damage to crops in some part of the state. Reports of damage caused by grasshoppers in 1912 first began to be received in June. The western part of Merced County, and parts of Kings and Kern Counties were most affected. In the vicinity of Los Banos, Merced County, where the investigation was carried on, grasshoppers give some trouble each year but their depredations in 1912 were more extensive than usual. On many of the ranches the entire summer crop of alfalfa was destroyed. The only control measure resorted to was burning over of pasture and alfalfa land. As most of the grasshoppers already had wings when the burning was done, the majority escaped unharmed. Garden truck and small trees in the infested areas were attacked by the pests. Corn, tomatoes, and even onions were stripped of every leaf. In many instances small shade trees, even including eucalyptus, were completely defoliated.

The species of grasshopper causing the damage was the differential grasshopper, *Melanoplus differentialis*. The only other species noted at the time were *Camnula pellucida*, *Conozoa behrensi*, and *Parapomala calamus*.

An estimate of the numbers per square yard in the infested areas was obtained by counting the numbers disturbed by the observer at each step. Little damage could be noted where grasshoppers were less than fifteen to the square yard. Where damage was greatest alfalfa fields averaged about twenty-five to the square yard. In some pasture land along the irrigation canals the number was estimated at thirty per square yard.

This will give the reader an idea of the conditions existing at the time observations hereafter recorded were made.

The neighborhood of Los Banos, largely due to the great irrigation system and to the large amount of land which has been 'swamped,' supports a very large bird population. Water birds and shore birds are very abundant along the canals and in the marshes, whereas the pasture lands, the alfalfa, and the trees, furnish food and cover for many land birds. During a week's stay, July 10 to 17, 1912, twenty-two species of water and shore birds were recorded and forty species of land birds. Censuses taken indicated that the Bicolored Redwing was the most abundant bird and that the Cliff Swallow, Barn Swallow, Western Meadowlark, Linnet, Western Kingbird, and California Shrike, listed in the order of their abundance, were also common.

Observation showed that the following species of birds were feeding on grasshoppers. Only those birds *actually seen* with grasshoppers in their bills were recorded.

Western Meadowlark, *Sturnella neglecta.*
Bicolored Red-wing, *Agelaius phœniceus californicus.*
Brewer's Blackbird, *Euphagus cyanocephalus.*
Bullock's Oriole, *Icterus bullocki.*
Arkansas Kingbird, *Tyrannus verticalis.*
California Shrike, *Lanius ludovicianus gambeli.*
English Sparrow, *Passer domesticus.*

Although observation in the field furnishes some evidence as to the kinds of birds feeding on an insect and the quantity consumed, yet it is on stomach examination that we must depend for accurate evidence as to the numbers of insects taken. In this instance a determination of the numbers of grasshoppers taken by the bird was made easy because of the presence of the mandibles of the insects — hard parts which remained undigested. Experiments

TABLE SHOWING STOMACH CONTENTS OF BIRDS EXAMINED.

Species	Number of stomachs	Kind of field	Time of day	Per cent animal food	Per cent vegetable food	No. of grasshoppers	Per cent of grasshoppers
Great Blue Heron	1	Marsh	Found dead	100	——	——	[2 gophers]
Killdeer	1	Pasture	10:10	100	——	11	100
Anthony's Green Heron	1	Pasture	4:00	100	——	14	15
Burrowing Owl	1	Pasture	12:30	100	——	28	90
Arkansas Kingbird	2	Pasture and alfalfa	2:00 10:30	100	——	5	67.5
Black Phœbe	1	Alfalfa	4:00	100	——	3	50
California Horned Lark	2	Pasture	12:30	52.5	47.5	5	7.5
Yellow-headed Blackbird	1	Tules	2:00	15.	85.0	——	——
Bicolored Red-wing	4	Alfalfa and pasture	8–4	94.0	6.0	38.0	81.2
Tricolored Red-wing	1	Alfalfa	4:00	97.0	3.0	6.0	97
Western Meadowlark	5	Pasture and alfalfa	8–12	99.2	.8	80.0	96.2
Bullock's Oriole	2	Orchard	9:50	98.0	2.0	30.0	92.0
Brewer's Blackbird	1	Pasture		95.0	5.0	3.0	80.0
English Sparrow	2	Wheat field	4:00	3.5	96.5	1.0	2.0
Cliff Swallow	4	Pasture	8, 4	100.0	——	2.0	7.5
Barn Swallow	1	Pasture	12:30	100.0	——	——	——
California Shrike	2	Pasture and alfalfa	10, 11	100.0	——	8.0	47.0

by other investigators as well as some performed by the writer show that insects such as grasshoppers are digested by birds in from three to four hours. Consequently the number of grasshoppers destroyed each day must be at least three times the number found in a stomach.

The following table gives the results of the stomach examinations. In spite of the comparatively few stomachs of each species examined the results should give a fairly accurate idea of the extent to which birds in the infested areas were feeding on grasshoppers.

Considering the capacity of the bird, the Burrowing Owl (*Speotyto cunicularia hypogæa*) must be considered the most efficient destroyer, twenty-eight grasshoppers having been found in the one stomach examined. Blackbirds and Meadowlarks however, exceeding in numbers of individuals, were probably doing the most effective work.

The comparative destruction of grasshoppers per day by single individuals and by the total number of each species is crudely

COMPARATIVE DAILY DESTRUCTION OF GRASSHOPPERS BY BIRDS.

Species	Average number of grasshoppers per day by one bird	total individuals of species
Anthony's Green Heron (*Butorides virescens anthonyi*)	42	1050
Killdeer (*Oxyechus vociferus*)	33	5445
Burrowing Owl (*Speotyto cunicularia hypogæa*)	84	1260
Arkansas Kingbird (*Tyrannus verticalis*)	8	1280
Black Phœbe (*Sayornis nigricans*)	9	180
California Horned Lark (*Otocoris alpestris actia*)	8	88
Bicolored Red-wing (*Agelaius gubernator californicus*)	29	78,590
Western Meadowlark (*Sturnella neglecta*)	48	24,720
Bullock's Oriole (*Icterus bullocki*)	45	4050
Brewer's Blackbird (*Euphagus cyanocephalus*)	9	225
English Sparrow (*Passer domesticus*)	2	100
Cliff Swallow (*Petrochelidon lunifrons lunifrons*)	3	2265
California Shrike (*Lanius ludovicianus gambeli*)	12	1200
Destruction per square mile by total bird population		120,453

represented in the table on p. 171. It should be here stated that censuses of the bird population by species were taken and are used in this calculation. The comparative numbers of the different species were calculated by averaging the two censuses taken and using the average per square mile as a multiplier.

Although the table is probably far from accurate, yet it gives some idea of the comparative destruction afforded by the different species. It will be noted that such birds as the Bicolored Red-wing and the Western Meadowlark, birds of small capacity, far outrank in destructiveness birds with large capacity, because of their greater numbers. Red-wings, Meadowlarks, Orioles, Kingbirds, and Shrikes appeared to be feeding almost wholly upon grasshoppers. Probably more than three-fourths of all the destruction by birds was accomplished by these five species. It should be of interest to note that these are mainly birds against which complaint is made upon the score of crop destruction. Even though the Bicolored Red-wing averaged but nine grasshoppers per bird in those examined, yet, on account of the numbers of individuals, it must be considered the most valuable destroyer. The one stomach of a Brewer's Blackbird examined probably does not demonstrate the true character of this bird's food at this time, for in other instances this blackbird has been found to be more insectivorous than the Bicolored Red-wing. The average Western Meadowlark must have consumed at least fifty grasshoppers a day.

Certain birds examined and found to contain but few grasshoppers doubtless fed to a larger extent on these insects when they were of smaller size. The swallows, for instance, owing to their small size, were unable to eat a large grasshopper. If the investigation could have covered the entire time of the outbreak, it would probably have been found that certain birds were far more efficient destroyers when the insects were small than when they became larger.

Fortunately some material collected at Los Banos the same month in 1911 was available. This afforded a comparison of the food of the Western Meadowlark and the Bicolored Red-wing in two successive years. As grasshoppers were less numerous in the summer of 1911, it has been possible to obtain information as to the comparative destruction by these birds when grasshoppers were in

relatively normal numbers and when they were in abnormal numbers. A glance at the following table will show the percentages of the different kinds of food taken and the average number of grasshoppers taken per bird.

COMPARATIVE DESTRUCTION OF GRASSHOPPERS IN TWO SUCCESSIVE YEARS.

Number of birds	Date	Per cent animal food	Per cent vegetable food	Average number grasshoppers per bird	Total per cent grasshoppers
	WESTERN MEADOWLARK.				
10	July 11, 22, 1911	99.0	1.0	7	83.1
5	July 15, 17, 1912	99.2	.8	16	96.2
	BICOLORED RED-WING.				
6	June 22; July 6, 1911	83.5	16.5	2	37.0
4	July 13, 16, 1912	96.0	4.0	9	81.2

Meadowlarks took very nearly the same percentage of animal food each year, showing that at this time of year the bird is almost wholly insectivorous. The availability of grasshoppers as a diet appears to have influenced the birds taken in 1912 for they averaged sixteen grasshoppers apiece as against seven taken by the birds collected in 1911. A greater difference in kind of food is to be noted in the Bicolored Red-wing.

As the number of grasshoppers in 1911 compared to the number in 1912 is not definitely known, it is impossible to say whether these birds changed their food habits in direct proportion to the number of grasshoppers or whether they were taken in an unequal proportion due to the extreme availability of the insects in 1912. The fact remains, however, that Meadowlarks and Bicolored Red-wings, and probably all other insectivorous birds, not only took greater numbers of grasshoppers when they were abnormally abundant, but also forsook certain usual articles of diet such as weed seeds and beetles, thus causing an increased percentage of grasshoppers to be taken as food.

One of the most interesting things which came out in the investigation at Los Banos was the evidence that at least one of the

shore birds and one of the herons had turned their attention to the grasshoppers. One hundred per cent of the food of a Killdeer was made up of grasshoppers, eleven having been eaten. The Killdeer being a common bird in the locality and having a greater capacity than smaller birds must be considered an effective destroyer. An Anthony's Green Heron collected along a canal contained fourteen grasshoppers.

Such then, are the conditions to be expected during an outbreak of grasshoppers. Birds flock to infested areas and also change their food habits to meet the abundance of a particular kind of food, thus doubly increasing their efficiency in helping to bring back normal conditions.

Let us now compare conditions to be expected in localities where grasshoppers exist in more nearly normal numbers. Since birds which forage on the ground feed to an especially large extent upon grasshoppers, we will depend upon the analysis of the food of such a bird for evidence. As an illustration of this type there is no better bird than the Western Meadowlark.

The Eastern Meadowlark is noted as a bird which feeds extensively on grasshoppers, 29 per cent of the food for the year being made up of these insects. Beal (U. S. Dept. Agric., Div. Biol. Surv., Bull. 34, p. 66) has pointed out that the eastern bird surpasses the western in the number of grasshoppers destroyed. He further states that nearly every species of bird in the east eats a larger percentage of these insects than does the related species on the Pacific coast in spite of the fact that in the west grasshoppers are available for a longer period each year.

Further evidence furnished by the examination of nearly two thousand stomachs of Western Meadowlarks taken in all parts of California and in every month of the year has shown that the western bird, although not equaling the record of the eastern bird, in reality takes larger quantities of grasshoppers than was at first supposed.

Fourteen and two tenths per cent of the total food of the Western Meadowlark for the year in California is made up of grasshoppers. An additional 5.2 per cent is made up of crickets (*Gryllus*) and an additional .9 per cent of Jerusalem crickets (*Stenopelmatus*). Five hundred and eighty-seven or 30.5 per cent of the nineteen hundred

and twenty Meadowlarks examined had eaten grasshoppers and an additional three hundred and thirty-nine had taken crickets.

The number of grasshoppers taken by Western Meadowlarks was found to vary greatly in different parts of the state. Evidently the number taken was governed by the availability of the insect. Meadowlarks collected at Eureka, Humboldt County, had eaten but very few and these had been taken in but three months of the year. Birds collected in the Sacramento and San Joaquin valleys had consumed large quantities. Of Meadowlarks collected at Red Bluff, Tehama County, over 28 per cent of the food for the year was found to be made up of grasshoppers and 27.5 per cent of the food for the year of Meadowlarks collected at Newman, Stanislaus County.

Birds in the vicinity of Los Banos, Merced County, must consume a similar amount of grasshoppers for during the five months, March to July inclusive, a time of year when these insects are not found in maximum numbers, Meadowlarks from this vicinity showed that 25.2 per cent of their food was made up of these insects.

Some interesting evidence of the change of food habits to meet the abundance, or better the availability, of grasshoppers is furnished by the results of an examination of the stomach contents of Meadowlarks collected in 1911 and in 1912 at Newman, Stanislaus County. Sixty per cent of all the birds of this species collected in this locality during the year 1911 had eaten grasshoppers and 27.5 per cent of the food taken was made up of these insects. In 1912 when grasshoppers were far more numerous, nearly 42.5 per cent of the food of the same number of birds taken during the same month was made up of grasshoppers.

A similar change of food habits to meet local conditions was exhibited by Meadowlarks collected at Hollister, San Benito County, in 1911. In this locality over 18 per cent of their food was made up of crickets (*Gryllus* sp.) and but 7 per cent of grasshoppers. In the month of August only did grasshoppers exceed crickets in the food and then only by one per cent.

The highest percentage of grasshoppers taken by Western Meadowlarks in any one month was by four birds collected at Salinas, Monterey County, in June, 1911, 93.7 per cent of all their

food being made up of grasshoppers. Four Inyo County Meadowlarks taken in August showed that 82.5 per cent of their food was made up of these insects.

Meadowlarks taken at El Toro, Orange County, showed one of the best records. Grasshoppers had been taken every month of the year and made up very nearly 42 per cent of the food. As an average of a dozen birds collected each month during a year was available from this locality this must give a fair idea of the extent to which Western Meadowlarks feed upon grasshoppers in this vicinity; viz.

TABLE SHOWING NUMBERS AND PERCENTAGES OF GRASSHOPPERS CONSUMED BY WESTERN MEADOWLARKS TAKEN IN THE VICINITY OF EL TORO, ORANGE COUNTY, CALIFORNIA.

1911	Number of birds	Number of grasshoppers	Average number of grasshoppers per bird	Average percentage of grasshoppers
June	13	53	4.0	43.2
July	7	59	8.4	77.5
August	19	314	16.5	93.9
September	6	75	12.5	96.3
October	13	122	9.3	61.9
November	8	115	14.3	66.6
Totals and averages	66	738	10.1	73.3

The average destruction per day can be obtained by multiplying the figures of the table by three. The numbers given are the numbers actually found in the stomachs. The fact that sixty-six Meadowlarks taken in the six months when grasshoppers are abundant, and in a locality where outbreaks are almost unknown, averaged ten grasshoppers apiece or thirty a day, furnishes convincing evidence of the large toll exacted by this bird. The fact that 96.3 per cent of the food of six birds taken in September was made up of grasshoppers is also significant of a preference for this insect.

It can be seen therefore, that no small part of the food of the Western Meadowlark is made up of grasshoppers. In fact the only

other insect making up a larger percentage of food is the ever-present beetle.

The individual records of meadowlarks show that the numbers of grasshoppers taken is very large as well as the percentage taken as food. From fifteen to thirty average-sized grasshoppers are usually consumed every four hours. Meadowlarks collected near Stockton, San Joaquin County, March to April, 1911, averaged nearly six grasshoppers apiece, thus showing a daily average of over seventeen. The same birds averaged ten crickets per day. Grain, weed seeds, and other insects made up the larger part of the food. A young meadowlark was fed 28 small grasshoppers (half an inch in length) at one meal. The capacity for the destruction of grasshoppers is therefore very great. The extent to which this capacity is used is dependent on the availability of the insect.

Such is some of the evidence regarding the destruction of grasshoppers by birds in California. It allows of the conclusion that birds are really a significant agent in the destruction of these pests. It does not allow of the conclusion that they can be relied upon to limit their numbers below the point where damage can result. Man demands too great a readjustment of natural conditions to permit of complete dependence on the natural order of things. But because artificial means of controlling insect pests must be used, the value of a knowledge of the interrelations of organisms is in no way lessened.

In a study of this kind we can at best but discover the more obvious relations between birds and insects. Occasionally we can infer that certain interrelations exist which are not capable of being demonstrated by direct evidence. For instance: The failure of birds to check an insect outbreak after insects have appeared in abnormal numbers is evident to all. The success in preventing insects from becoming abnormally abundant is not apparent. In fact no absolute proof of their good work in this connection is obtainable. It must simply be inferred from data regarding the food of birds and their relation to insects when they appear in abnormal numbers, that the regulative influence exerted at times when normal conditions exist is just as important if not more important than their influence under abnormal conditions. It seems safe to conclude that the regulative influence exerted by birds keeps pace with the fluctuations of insect life.

ON THE HABITS AND BEHAVIOR OF THE HERRING GULL, LARUS ARGENTATUS PONT. (*Concluded.*)

BY R. M. STRONG.

Plates XIX–XX.

VII. REACTIONS TO STIMULI.

1. *Auditory.*— I know of no experimental work on the reactions of gulls to sound stimuli, but I have made numerous observations in the field and with my captive gulls which show that hearing is reasonably keen in these birds, especially under certain circumstances. The bird shown in Plate VII, Fig. 2,[1] was easily startled during the earlier part of my tent studies by the small though sharp noises made by the shutters of my cameras. During the course of the day, this gull became less and less sensitive to such noises and to other slight sounds which came from my tent, though one end of the tent was hardly five feet away. The responses finally consisted of little more than short turns of the head. A pistol shot from a boat fully a quarter mile away from shore caused a wild panic on the island. Little attention had been given to the boat before the shot was fired and boats could come nearer without causing a disturbance so long as no shooting occurred.

On another occasion, the sharp noise made by a falling timber on the beach caused great alarm among gulls which could hardly have seen the fall. Great excitement was caused during the night of my stay on one of the Strawberry Islands by the noise produced by a falling board which was blown down from a position against my tent. It is improbable that many gulls if any could have seen this board fall. The resemblance of such noises to that made by the firing of a gun undoubtedly explains the intensity of the reactions. Many and perhaps all of the adult gulls had learned the significance of a gun shot.

My captive gulls when tested by some simple experiments on Sept. 27 and 29, 1913, were not much disturbed by any noises which

[1] See Auk, January, 1914.

1. GULLS FACING THE WIND IN A STORM.
2. YOUNG GULL, HALF GROWN BUT STILL IN DOWN PLUMAGE, PANTING.

I made out of their sight, though they responded to various sharp sounds or to a sudden shrill whistle by quick turns of the head.

2. *Visual reactions.*— Like practically almost all birds the Herring Gull is predominately visual in its behavior. It also appears to be unusually alert to visual stimuli. Rapid movements, especially, are noticed as is the case with most seeing animals, so far as we know anything of their reactions to visual stimuli.

Standing outside of my tent, I could distinguish the form of a man inside through the thin tent cloth, in certain positions with reference to the sun's rays. Small portions of the man's figure were also visible to me through narrow openings at the corners of the tent. It does not seem probable to me that the gulls could fail at least occasionally to get such glimpses for they often came within a few feet of the tent and it was evidently under constant scrutiny. Nevertheless, neither the gulls nor any other birds appeared to notice these evidences of the presence of a man inside. The visual images afforded under such circumstances were of course of very low light intensity and of vague outline. They were also very incomplete and often only small portions of a human form would be even faintly visible. At any rate they seemed to lack the intensity or completeness necessary for arousing the associations connected with the appearance of a man in the open.

On the other hand, I obtained some interesting evidences of sensitiveness to very small visual stimuli under other circumstances. In the course of my tent studies, I found a need for new openings before the series of apertures which appears in Plate IV, Fig. 1, had been prepared. A large pocket-knife blade was used for the purpose, and the cloth was cut cautiously. On two occasions the knife blade slipped through the cloth, unexpectedly, exposing a large portion of its length. These occurrences were the causes of small panics among a number of the gulls in the vicinity. The appearance of a small portion of my hand through one of the corner openings caused considerable excitement even when no rapid movements were involved.

I used my camera, however, at the openings with considerable freedom after the first hour or so of quiet watching inside the tent. The lens was often pushed partly through an opening without arousing any significant disturbance. It was a dark object and it

was moved slowly, whereas the shining steel of the knife blade came into view suddenly.

In spite of the failure of the gulls to be disturbed by possible glimpses of the man inside the tent, there is abundant evidence that these birds see unusually well, as compared with most birds, in weak light. As will be discussed in the section of this paper which deals with the nocturnal activities of gulls, these birds are often active at night. My captive gulls if very hungry will eat in considerable darkness when their food is placed in a customary position, even when it is not easy for me to make out more than the bare outlines of the pieces of food. Thus on May 3, 1913, I fed my gulls at about 8 P. M. The sky was clouded, and there was barely enough light to follow the movements of the birds from a position about fifteen feet away. The birds, which were thoroughly hungry, moved about somewhat uncertainly but they fed promptly from the two dishes in which their food was placed. When these birds were still partly in the nestling down plumage, on the evening of July 8, 1911, I made some notes on their movements at night. There was some light from the moon which was at half phase. I found the birds swimming or standing at the edge of the water in their enclosure, and they seemed to move easily in the semi-darkness.

During even the darker portion of the night that I spent on Middle Strawberry Island, I had plenty of auditory evidence that both adult and young gulls were more or less active when it was too dark for me to see anything of the birds. The moon set about 1:00 A. M., and there was no light except that furnished by the stars. Adult birds were evidently flying occasionally, and juvenals were occasionally heard peeping.

On many occasions, food has been brought to my captive gulls in paper wrappers. Often the package has been placed on the ground more or less completely open. When the paper is flapped by wind, the gulls show a good deal of apprehension. At one time they would not approach the package, although they could see that food was inside. They have become more accustomed to the flapping paper but have not entirely lost their fear of it. This experiment has been attempted only occasionally.

Even when there has been no flapping paper, great distrust has been shown for the package, when the contents were covered by

it though not entirely hidden. Under such circumstances, food is removed with slow and timid approaches followed by quick retreats. Flapping pieces of paper were for over a year very disturbing to the captive gulls, but after they had been fed daily for some weeks with food placed on a sheet of paper, their fear of moving paper decreased greatly.

3. *Reactions to Chemical Stimuli.*— During considerable portions of the time that I have had the captive gulls, I have conducted experiments on their reactions to chemical stimuli. A preliminary statement[1] concerning the results of this work has already been published, and I plan to publish another fuller account later. In general, I may say here that I have found my captive gulls showing what I interpret as a dislike for pieces of liver that had been dipped in solutions of table salt or in weak acids. The following notes are extracted from my records of the first experiment. On July 11, 1911, I placed a number of pieces of herring in a strong solution of table salt in a pan just before feeding the gulls. Another pan contained similar pieces of herring without any salt. The birds were very hungry not having been fed since the previous evening. All three birds showed great aversion for the salted fish. Two ate of the salted food at once and the other joined them in a moment. The response was immediate, one bird disgorging what it had swallowed. Another dropped what it had taken, and the third swallowed only one piece. All three birds ran to water in less than a minute and drank heartily, though they had taken very little of the solution. They did not return to the food during twenty minutes that I waited. Experiments with other materials were carried on after this until Sept. 6, 1911, when a 10% solution of sodium chloride was employed. Pieces of liver were placed in the solution. The birds were exceedingly hungry and ate voraciously paying no attention to the salt solution. On Sept. 23, a 20% solution of common table salt was tried with pieces of liver. The birds were not so hungry at this time. One went to the dish containing the salt solution and picked up a piece of liver with the tip of its beak. After a few minutes of cautious manipulation of the liver it was taken into the bird's mouth only to be hurriedly ejected. The gull

[1] Strong, R. M. 1912. The Sense of Taste in Birds. Science, N. S., Vol. XXXV, No. 911, June 14, p. 940.

at once jumped into the swimming tank and drank water, washing its beak vigorously. The other gulls did not take any food on this occasion while I was present. Later, similar reactions were obtained with weaker solutions of table salt and also with weak acids. Food was often rejected, even when the taste was just perceptible to me under the conditions of the experiments.

So far, I have almost no significant results with bitter and sweet solutions, although a great many tests have been attempted. This has been surprising to me as results were obtained readily with chicks and ducklings for the same solutions, with food, however, which would hold more of the solution.

The point of greatest interest to naturalists, perhaps, is the reaction to salt solutions, as it has long been a question to what extent sea birds drink sea water or tolerate it in their food. My gulls were fresh-water birds, of course, as they came from Green Bay, but field observations on salt-water gulls are in agreement with my experimental results, so far as they go.

Thus Anthony [1] states "That gulls drink sea water and can thrive on it is a fact not to be questioned, but I am of the opinion that when fresh water can be obtained without too much trouble they will drink it in preference. Several years ago I camped for a few days on the beach near a small fresh-water pond; during my stay sea gulls were constantly flying in from sea to drink, bathe, and preen their feathers. Many single birds were noted flying from as far as the eye could reach direct to the pond; after a few moments of rest and a drink, they returned to the sea in a manner that very plainly indicated that they had business there and had happened in merely to get a little fresh water." Several species of gulls were discussed in this article, including the Herring Gull, but, unfortunately, no single species is designated for the observations just quoted. Furthermore, Anthony does not give any evidence for his statement that gulls drink sea water. My own observations indicate that Herring Gulls, in cold weather, at least, do not need to drink often. They do not wander far from land relatively, and they are probably usually within a reasonable distance from fresh water.

Though fish and other meat that has begun to spoil are eaten to

[1] Anthony, A. W. Random Notes on Pacific Gulls. Auk, 1906, Vol. XXIII, No. 2, pp. 129–137.

some extent by very hungry gulls, fresh food is evidently preferred. My captive gulls never touch spoiled liver, for instance, if not very hungry, though fresh liver is taken promptly at such a time. Liver which has just begun to spoil, if eaten, is not taken with the same greediness, and a smaller quantity is swallowed. The first piece of tainted meat may be taken eagerly and sometimes partly swallowed only to be rejected. One or more pieces may be swallowed in haste if the birds are exceedingly hungry, before signs of disgust appear. Other pieces are handled with care on the same occasion, if touched at all. Bread which has been soaked in water that has contained such food as fresh raw liver, is eaten more eagerly than when plain water is used to moisten the bread.

It is a common practice of my captive gulls to carry some of their food to their swimming tank where they play with it in the water. A piece of liver is held in the beak and moved about under water with quick jerks of the head or it is dropped in the water to be seized before it has sunk far. This performance happens more frequently when the food has been lying in a chemical solution or when it has accumulated considerable dirt as a consequence of having been dragged on the ground. Such rinsing of the food does not occur at every feeding but is usual. The extent to which the food is thus treated also depends on the degree of hunger. When very hungry, food is bolted in a few seconds without much playing with it except sometimes for the last piece taken if hunger has been satisfied by the amount of food placed before the birds.

The behavior just described suggests some observations made by Anthony [1] with another species of gull. "I was one day watching some Western Gulls, a few yards from me on a wharf, when a large piece of salted fish was thrown out from an adjacent boat house. It fairly glistened with a thick incrustation of salt, and I was somewhat curious to see if the gulls would eat food so highly seasoned. No sooner had it fallen than it was seized upon by a gull and as quickly swallowed; but from the surprised actions of the bird it was evidently not to his liking; no sooner had it reached the stomach than it was ordered out again. Dropping the fish on the wharf, the bird eyed it for a moment.....Then picking up the fish it flew

[1] op. cit., p. 135.

down to the water, and holding it under the surface shook its head from side to side violently 'sozzeling' the meat about for several seconds. It was then taken back to the wharf, laid down and inspected, and carefully sampled; this time, however, it was not bolted as at first but held for a moment in the mouth and rejected, and carried back to the water where it was even more roughly laundered. This operation was repeated several times and the piece of fish, which must have weighed four ounces at the outset, was reduced to half that size before it reached a state of freshness that suited the palate of the gull."

4. *Other Reactions.*— It is generally known that birds have a special development of nerves and endings of general sensation about the mouth with large trigeminal nerves for the sense organs involved. It is consequently reasonable to expect that my gulls when suspiciously manipulating food of uncertain palatableness employ their general sensation to a large extent. We do not know to how great an extent general sensation and the taste sense are used relatively by birds, but such information as is available indicates that the former plays the larger part. It has been shown by Botezat [1] for the birds which he studied that taste endings occur only in the back part of the mouth cavity and especially at the entrance to the gullet. In some birds they were also found at the base of the tongue, but they were never numerous.

On p. 181 of this paper, I described the behavior of one of my gulls when it started to eat liver which had been lying in solutions of table salt for a few moments. The piece of liver was manipulated in the front part of the mouth at the tip of the beak by the apparently suspicious bird. No avoiding reactions resulted and the food was often swallowed. Such a result suggests that the region of the mouth where tactile endings occur is first used in testing food. It is quite probable that the salt solution adhering to the piece of liver did not stimulate the tactile endings of the bird in the experiment and so was swallowed with a consequent strong stimulation of taste endings as the food slipped into the gullet. I have made similar observations on this behavior of my gulls when given uncertain food, on a number of occasions. It is not improbable that

[1] Botezat, E. Die Nervenendapparate in den Mundteilen der Vögel und die einheitliche Endigungsweise der peripheren Nerven bei den Wirbeltieren. Zeitschr. f. wiss. Zool. Bd. 84, 1906, s. 205–360.

mutual relations of stimuli exist between the tactile sense of the mouth region and either smell or taste or between all three. Readers who may be interested in the physiology of the beak region are referred to Edinger's [1] suggestions.

Gulls regularly show a positive reaction to strong air currents, that is, they face a heavy wind whether standing or swimming and usually when flying. This reaction is illustrated in Plate XIX, Fig. 1, where an adult and a number of juvenals are seen facing a heavy wind. Rain was falling when the picture was taken.

When the wind is exceptionally heavy, especially if rain is falling, gulls are commonly seen flying and they face the wind a large part of the time. During an exceedingly violent storm which occurred in the early afternoon of July 15, 1911, when I was on one of the Sister Islands, all of the gulls able to fly took to the air. Their flight manœuvres were similar to those which gulls so often show over a beach during a gale, at other times of the year. It is obviously more convenient to face a heavy wind as the bird's body is adapted to meeting air currents head on with little horizontal resistance.

Extremes of temperature apparently give gulls considerable distress. On a hot day, the brooding gull pants a great deal even when perfectly quiet on the nest.

Young gulls, especially if excited, pant constantly when the temperature is as high as 90° F. (see Plate XIX, Fig. 2). My captive gulls become very uncomfortable, apparently, and pant a great deal after taking only a few short flights of several yards each in their enclosure on a hot day. At such times they seek water and, if undisturbed, indulge in much bathing.

In zero weather (Fahrenheit) my captive gulls though well fed and fat appear to suffer from cold, especially after eating cold food. If the ground is covered with snow or ice in zero weather, the gulls squat upon their feet, apparently to keep them protected by their plumage. They rarely stand up at such times except when disturbed or to obtain food. They also show their sensitive-

---

[1] Edinger, L. The relations of comparative anatomy to comparative psychology. Jour. Comp. Neur. and Psych., Vol. 18, 1908, No. 5, pp. 437–457.

Also see Vorlesungen über den Bau der nervösen Zentralorgane des Menschen und der Tiere. Bd. 2. Aufl. 7, 1908 (or a still later edition). Leipzig, F. C. W. Vogel.

ness to cold by shivering although probably in perfect health. Wild gulls with abundant opportunities for flying apparently keep warm by being active, and I have not seen them showing such distress from cold.

VIII. SPECIAL ACTIVITIES.

1. *Flight.*— The great power in flight and especially the wonderful soaring performances of the Herring Gull are almost too well known to be discussed here. The wing strokes are relatively slow and the arc covered by the elbow is not large as is characteristic of birds with long wings.

I have witnessed on several occasions both on the Atlantic Ocean and on the Great Lakes the peculiar ability of the Herring Gull to follow or accompany a ship in the face of a strong head wind by soaring flight only, as described so well by Brewster.[1]

It is a matter of common observation that gulls indulge in soaring manœuvres over a beach when a heavy wind is blowing off the water. At such a time they may often be seen soaring sidewise as well as forwards. I have seen Herring Gulls cover more than 200 yards in a single rapid sail sidewise along the beach, always facing the wind and not losing altitude. The Herring Gull is unusually skilful among gulls in soaring, and some of its feats are, to my mind, the most difficult to explain of all soaring phenomena.

The manner in which the feet are carried has been discussed by Anthony.[2] When starting flight the feet hang downward, sometimes until the bird is a number of yards from the starting place, and they are dropped just before alighting.

2. *Bathing and Drinking.*— References have already been made in this paper to the frequency with which Herring Gulls bathe in warm weather. My captive gulls enjoy swimming and bathing in their tank, even in winter, so long as the temperature of the air is not very much below freezing. When swimming the Herring Gull sits high on the water, probably in part because of the large amount of air contained in the dense ventral plumage. Possibly

[1] Brewster, W. Notes on the Flight of Gulls. Auk, 1912, Vol. XXIX, No. 1, pp. 85–92.

[2] op cit., p. 132.

this extreme buoyancy which also involves a large pneumatisation of the skeleton, explains the fact that gulls do not often dive to the extent of completely immersing their bodies.

When bathing, the Herring Gull dips its bill and often the entire head into the water with rapid bowing movements. At the same time the wings are flapped vigorously and water is splashed over the entire body. The performance is more or less the same whether the bird is floating on water or standing in shallow water.

During the colder weather of the winter, my captive gulls are deprived of all opportunities for bathing, as their tank is emptied. They become very dirty, consequently, in a city like Chicago. With the coming of spring, the tank is refilled and a regular orgy of bathing follows. Each bath lasts for several minutes and is followed by feather dressing and partial drying of the plumage. Then another bath is taken. This may continue for an hour or more. In the course of two or three days the plumage becomes quite clean.

On July 29, 1911, I found a young Herring Gull at one of the Strawberry Islands in well developed plumage and apparently old enough to fly. It was sitting quietly on the ground at the base of a tree at least fifty feet from water. On examination, I found the bird to be very much emaciated; it was too weak to make effective efforts to escape, in fact it could not stand upright. I took the gull to the water and gave it a chance to drink. It was evidently very thirsty, and drank eagerly. After taking what water it wished, the bird took a bath going through such movements as its limited strength and my grasp would allow. During the following week, I gave this bird frequent opportunities to bathe always holding it in my hands, and the bath was always taken without hesitation. The principal features were a plunging of the head under water with a quick removal, followed by a shake of the head which splashed water over the body. This bird ate ravenously but it was too weak to stand up for any length of time, and died in about two weeks. An autopsy was performed by a pathologist who was unable to find any other explanation for its death than the starvation the bird had experienced before I found it.

During the bathing performance the gull appears to drink more or less water, but it is difficult to say how much is taken. In hot weather there appears to be considerable water drinking by brood-

ing birds. The gull which appears in Plate VII, Fig. 2,[1] was studied carefully from my tent for several hours on June 26 which was a very warm day. During the middle of the day this bird made trips to the beach edge for water so frequently that I timed some of the periods. I found that the intervals between drinks varied from three to ten minutes. There was more or less bathing each time the bird went to water. I did not note any water drinking by gulls not brooding, at the breeding place.

My captive gulls seem to need very little water to drink in cold weather. During the first winter it was my practice to take warm water to the gull yard which would not freeze over immediately. In the winter of 1911–12, the temperature was below 0° F. for some weeks and during quite a portion of this time there was neither snow nor ice in the place occupied by the gulls. No other opportunities were present for the gulls to secure water than in their food or in the very slight amount of water which adhered to the food, mostly liver. I never saw any evidence of interest in the water which I brought to the gulls, and they seemed to thrive without it.

3. *Perching.*— The Herring Gull being a web-footed bird would not be expected to have a perching habit, nevertheless it does perch sometimes, after a fashion. One of my captive gulls may be seen in Plate XX perched on the side of the swimming tank, a position not infrequently assumed by these birds on leaving the water. On July 29, I saw Herring Gulls perched in the foliage of the upper outermost branches of tall trees on one of the Strawberry Islands. They did not remain there long and they presented the appearance of standing on foliage rather than on single limbs.

Other observers have reported seeing Herring Gulls perched in trees. Thus Clarke[2] saw these birds perching in pine trees while their nests were being photographed. Fleming[3] noted Herring Gulls roosting on some dead pines at night. Of course there is no such gripping of the perch by the feet of a gull as is done by a true perching bird.

---

[1] See Auk, January, 1914.

[2] Clarke, C. K. Ontario Notes. Auk, 1901, Vol. XVIII, No. 4, p. 401–2.

[3] Fleming, J. H. Birds of Parry Sound and Muskoka. Auk, 1901, Vol. XVIII, No. 1, p. 34.

HERRING GULLS IN JUVENAL PLUMAGE. ONE BIRD PERCHING AND ANOTHER SWIMMING.

IX. COMPARISON OF DIURNAL AND NOCTURNAL BEHAVIOR.

As Herrick[1] has well said, there is no repose by day or night in a gull colony. Adults take naps at all hours, either while on the nest or standing near. Often they simply doze with the head drawn close to the body and the eyes shut, or the bill may be tucked inside a wing with the eyes either open or closed in view. During the day groups of gulls stand about dozing as may be seen in Plate X, Fig. 2.

In order to get an idea of the entire daily cycle of activities at a gull breeding place, I spent a night at one of the Strawberry Islands. I arranged my trip so that it would cover those hours not included on other days. Ward also spent a night at a gull colony and I quote his interesting account[2] of his experiences as follows: "Sleep seemed to occur perhaps a little more frequently during the warmer hours of the afternoon than at other times, though pretty evenly distributed through the twenty-four hours. The birds sometimes stood, but more frequently squatted on the ground and turned their heads over their backs and tucked them under their wing feathers. Sleep was of very short duration, as fights, panics and alarms of various sorts followed one another too closely to allow of unbroken repose for more than a few minutes at a time. The night that I spent among them there was less sleep than during the day. The sun set about half past seven; but at eight o'clock the colony was as busy as ever fighting, making abortive nests and screaming. At ten minutes past eight the moon arose, and ten minutes later nearly all the gulls suddenly took wing in what I conceived to be a panic, until shortly afterwards I spied a large flock of them on the water in the direction of the moon. Later they worked around the island, so that I was between them and the moon, and I could then see that they were busily fishing. My notes continue up to a quarter of three, when I fell asleep with the gulls still on the water and noisy. When I awoke at twenty minutes after four the sun was up, most of the gulls were on the island and many young were teasing a few adults for breakfast."

On July 7, 1911, at 7:20 in the evening, I was on the island and

[1] Herrick, F. H. The Home Life of Wild Birds. Revised Ed. 1905. Putnam's Sons, New York and London. p. 112.

[2] Ward, H. L. Notes of the Herring Gull and the Caspian Tern. Bull. Wisconsin Nat. Hist. Soc., Vol. IV., No. 4, October, 1906, p. 132.

I left the next morning at 7:05. My blind was erected, and I was inside ready for work at 7:45 when my companion left the tent and went away in the motor boat that had brought us. Within ten minutes, the gulls had settled down to normal activities, i. e. when the boat had gone a fair distance from shore. The "challenge" and mewing cries were made a number of times during the following half hour. I also heard the quack of a Red-breasted Merganser occasionally during this period, and a Bronzed Grackle flew near the tent. At 8:25 a Spotted Sandpiper call was heard, also a very young gull apparently calling for food. By 8:40 it was too dark to see my writing, and the gulls were quieter. There was an outbreak of noise, however, at 8:43 which lasted for a minute or so. I used a small pocket electric flash light, carefully concealed during the night, to see my watch and to make notes.

About 9:30 when the sunset glow was practically gone, a board was knocked down from one end of my tent, making a noise which alarmed the whole colony, and no birds came near my tent except in flight, so far as I could determine, until daybreak. The moon set about 1:00 A. M., and there was only starlight. I could not see any birds but I could hear them flying about all night giving the alarm cry, at intervals. The gulls were less noisy from 1:00 to 2:45. Small juvenals were heard calling occasionally through the night.

Shortly before 3:00 the first glow of approaching day appeared in the east, and the gulls began to settle down near my tent. They also became very noisy especially with the challenge cry. At this time I noted a female Red-breasted Merganser playing in the water not many feet away. Song Sparrows were singing, and Bronzed Grackles were active. A few minutes later a very small juvenal gull ran to the edge of my tent some fifty feet from where I first saw it. It passed within five feet of two adults who gave it no attention. The sun rose about 4:20, and at 4:25 two adult gulls came within three feet of my tent where they remained about a minute. They then flew away a short distance and returned to a point about ten feet distant. No birds were seen on nests, as the incubation season was over on this island.

At 4:40, I noted gulls bathing, and at 5:00 I saw a very small juvenal paddling ashore. A fight occurred between two adults

which was broken up by the interference of a third adult. About the same time I saw an attack on a juvenal gull by an adult resented by another adult. Challenge cries and mewing calls made a great noise at this time. Other juvenals which had been standing near the place where the attack was made disappeared.

A few moments later, I saw three gulls worrying a Great Blue Heron in full flight, much as kingbirds harass a crow. The heron finally disappeared in the woods on the largest of the Strawberry Islands where a heronry was located and from which I had heard noises throughout the night.

Another fight between adults occurred at 5:15, and as usual with no apparent injury to the participants. When the contest was over, the two birds faced each other and made a feint at renewing hostilities. Then they went through the challenge performance simultaneously.

At 5:25, I noted that I had seen no feeding and that most of the juvenals gave no evidence of desiring their parents, but at 5:45 I saw a downy juvenal teasing an adult for food and a feeding occurred a few minutes later. After the feeding, both birds drank water, and the adult swam out from shore about twenty feet where it took a bath. I noted at 6:25 that downy juvenals were standing idly most of the time or dressing their plumage. An adult approached a juvenal, and another adult flew to the spot, apparently to drive the first adult away.

I was unable to determine what the gulls were doing during the darker part of the night after the setting of the moon, beyond the flying already mentioned. Judging from the sounds, many of them were on the water as was the case during Ward's night at Gravel Island. Whether the falling of the board had anything to do with the absence of the gulls from at least my part of the island is uncertain. As the birds left Gravel Island at nearly the same time in the evening according to Ward's observations, there is some reason to believe that the board accident was not responsible. It is conceivable that there was some fear of the tent in the darkness which did not exist in daylight. Or possibly, the birds feel safer on the water at night and are in the habit of remaining there in a flock during a major portion of the night, when uneasy.

During the night of July 5 and 6, 1907, I camped on Partridge

Island in Lake Superior, about one mile from Gull Island, where a colony of gulls were breeding. In the latter part of the night just before dawn, I heard the cries of gulls flying overhead. The night had been very dark as the sky was clouded.

Some observations on the nocturnal activities of Herring Gulls have been reported by Schuster.[1] He noted these birds feeding on the river Mersey at Liverpool. Large quantities of food, thrown into the river at night from ships, are stated to be responsible for this nocturnal feeding. The gulls are described as flying and feeding silently.

Various writers speak of gulls "roosting" at night, and my captive gulls apparently sleep during the night, as a rule. It seems probable that gulls usually rest during the night, except during the breeding season or when food is especially available at night. It is also probable that gulls are not active when the darkness is intense.

X. Variability and Modifiability in Behavior.

According to Herrick [2] whose conclusions are in general supported by my own observations: "The life of birds is one of instinct irradiated by gleams of intelligence. Their mental faculties exhibit a wide range of gradation from excessive stupidity to a fair degree of intelligence with strong associative powers of things with ideas."

In my study of the Herring Gull, I have been especially interested in attempts at determining the extent of the "gleams," a fascinating but very elusive topic. The resourcefulness which animals show in new situations and the extent to which their behavior may be modified by new conditions may be considered fair criteria of their intelligence. Variability in behavior, however, has some bearing on the problem of intelligence. We must recognize perhaps two types of variability in behavior which do not indicate intelligence as it is commonly understood. They may even tend towards confusion in our analyses of behavior, as acts which may seem to

[1] Schuster, W. Möwen als Nachtvögel. Zool. Beob. Frankfurt a. M. Jahrg. 47, No. 3, S. 79, 1906.

[2] The Home Life of Wild Birds. Revised Ed. 1905. G. P. Putnam's Sons, p. 212.

indicate resourcefulness or adaptiveness may be only variations in stereotyped behavior.

It is to be expected that so-called pure lines or strains may be found among the behavior characteristics of a species as well as in other characters. Some of these strains may possibly be the result of or be accentuated by such segregation as is afforded by separate breeding places. Unfortunately we know nothing concerning the relationships of individuals in one colony to those of another. We have no information concerning whether gulls breeding at one of the Strawberry Islands, for instance, have interbred in recent years with Gravel Island gulls. Furthermore, we have no data as yet, concerning the existence of definable pure lines in the morphological characters of Herring Gulls.

The other type of variability in behavior is not associated with pure line inheritance. It represents simple chance variations from the average type of behavior which are to be expected just as we find variations in morphological characters.

In the section of this paper which deals with the general behavior of juvenal gulls, I mentioned variability in the behavior of some newly hatched gulls. A single bird in one nest showed no terror, whereas two nestlings of essentially the same age in another nest were in great distress from fright over the presence of human intruders. I can think of no reason for considering that either the quiet bird or the frantic pair were more intelligent or that either form of behavior was adaptive. Nor have we reason to believe that it was a case of pure line differentiation. It seems quite possible that chance variations in the metabolic states of the birds or possibly in their nervous organization were responsible for the difference in reaction to our presence. It is conceivable that the reactions would have been either similar or reversed if we had approached the nests a few hours later.

A large amount of variation has been noted in the choice of materials used in constructing the nest. Evidently the Herring Gull uses what is available with a preference for finer and softer materials. It seems probable to me that such nest building, which is evidently mostly instinctive or stereotyped, is not absolutely without the elements of intelligence. There must be adaptation of special materials which may be found, to use and location.

Though the general form, size, and location of the nest are characters of the species, the variations which fit the nest to its special location, for instance, are no more stereotyped than various acts of man which are called intelligent.

As a consequence of persistent nest robbing, gulls at certain breeding places have been reported as taking on a tree nesting habit. I know of no evidence worth considering for believing that the recent ancestors of such birds were tree nesters, and we have every reason for considering the inherited choice of location for most Herring Gulls as on the ground.

We have already seen in this paper that even the structure of the nest may be modified in adaptation to the location in a tree. More skill is shown in weaving the nest, according to reports, so that it will hold together in its tree location. Of course it may be said that tree nesting by the Herring Gull may be due to a so-called latent instinct which appears when persecution compels the bird to seek a safer place for its nests. We have however, no reason to believe that instinct behaves in inheritance differently than other characters. Our knowledge of the laws of inheritance does not furnish any basis for thinking that an instinct for tree nesting can exist for long periods of time in a species that has another habit, without itself appearing.

Herrick [1] seems to consider tree nesting for the Herring Gull to be a variation without much significance. He found a small percentage of gulls nesting in trees at a height of from six to ten feet. In his judgment, this position affords no protection to the birds. I have seen no nests above the ground though trees and bushes cover most of the ground on all but two of the islands where I have seen gulls breeding.

To me such tree nesting as Audubon [2] described suggests real resourcefulness, but we know too little about it to be warranted in making any generalizations concerning the intelligence it may involve. In some colonies tree nesting may possibly be the inherited habit or instinct of certain strains or "pure lines" of Herring Gulls.

The nestling offspring of tree nesting gulls are reported as re-

[1] Herrick, F. H. Nests and Nest Building in Birds. Part II. Journ. Animal Behavior. July–August, 1911. Vol. I, No. 4, pp. 244–277.

[2] Audubon, J. J. Ornithological Biography. Edinburgh. 1835. Vol. III, pp. 588–589.

maining in the nest when observed, though gulls of the same age on the ground would never be found in the nest but would always be hiding. That tree nesting juvenals do not leave their nest until they are able to do so without injury, is probably due to a realization of the danger involved in such an attempt. This remaining in the nest under such circumstances may possibly be regarded as intelligent behavior of perhaps a low order which prevails over any blind instinct to leave the nest to hide when intruders appear. Just how much this behavior is tied up with instinctive activity is of course beyond our knowledge.

The promiscuous feeding of juvenal gulls at Gravel Island appeared to me to be a variation from the probably usual habit of parents feeding their own offspring. Unfortunately we lack data for establishing the extent of this variation. It could easily be the consequence of the congested life on the island. I have noticed that juvenal Wilson's Terns seek food of any adult that may happen to come near them with food in its beak, but all of my observations indicate that the parent tern probably feeds only its own offspring. The gull must go through the somewhat complicated process of regurgitation which seems far from voluntary. Large numbers of juvenal gulls crowding about an adult who perhaps sees its own offspring in the mob may be able to snatch the food regurgitated without regard to parental relationships.

A large number of so-called lower birds like ducks, coots, etc. and the various species of gulls learn rather rapidly where they may feed and breed without molestation by man. In the course of only a week, wild ducks become far less shy on bodies of water in or about cities than when they arrive, a matter of common observation. Gulls likewise recognize even more positively that they are relatively safe in such places, but they are exceedingly wary wherever shooting occurs. Such discrimination undoubtedly involves at least the rudiments of intelligence even though the activities in question may be largely instinctive.

I had hoped to carry on some experiments on modifiability in behavior with gulls, but my time was taken up so largely with the general observations which I thought should come first that only a single experiment was started. An entire nest was moved four feet to one side at a distance of about one hundred feet from my

tent. The nest was under observation for several hours, and what appeared to be the owners were seen standing about the spot where the nests had been located. Though the birds seemed to be disturbed, they did not make any significant demonstrations of excitement, and they did not attempt to brood the eggs. Such an experiment should be started earlier in the season.

XI. MIGRATIONS.

After the breeding season is over, there seems to be a general movement southward. Thus on and after August 25, 1913, for instance, I saw a number of Herring Gulls, including both adults and juvenals, at Woods Hole, Massachusetts. I do not know how much earlier they may have been in the vicinity. Each day that I saw them they were in flocks with Laughing Gull adults and juvenals. So far as I know, Herring Gulls do not now breed south of Maine on the Atlantic coast. These birds had probably migrated from a point at least as far north as Maine.

"Gull Dick" as reported by Mackay [1] was in the habit of returning year after year to the region of the Brenton Reef Light ship in Narragansett Bay during early October. This bird left for the north in early April. In a report to Dutcher and Baily [2] it was stated that about 800 Herring Gulls arrived at Great Duck Island off the coast of Maine on March 12, and their numbers increased steadily until the 20th of May. Herring Gull adults and juvenals appear about Chicago in considerable numbers during the winter, and they are fairly common during a large part of April. The spring migration and the beginning of the breeding season apparently occur considerably later on Lake Michigan than on the Atlantic coast, a fact probably connected with the late clearing of the ice on the upper Great Lakes.

On September 21, 1911, my captive gulls, then juvenals, became very restless, and they ate very little food for seven days. On the 24th, I spent half an hour in my gull yard. The food that I had placed there on the previous day had not been eaten, and the gulls

[1] Auk, IX, 1892, pp. 226–228.
[2] Auk, XX, 1903, pp. 417–431.

paid no attention to the fresh supply I left. They were very restless and they were almost constantly flying about their quarters, often rising to the top of the enclosure, the most unusual feature of their activities. They went to the swimming tank which appears in Plate XX, frequently, though one of them prevented the others from spending much time on the water by driving them away. The gulls alighted frequently on the edge of the tank as shown in Plate XX, and they often remained there two or three minutes except when the belligerent gull drove the others away.

I have never seen so much activity by these birds as at that time except possibly on two or three other occasions which were also at the time of gull migrations. Unfortunately, it has not been practicable for me to watch the birds carefully during periods when migrations occur. The performances just described suggested to me the possible existence of a migration impulse as the cause. This suspicion is strengthened by the observations of others on the behavior of other captive wild birds at migration times, but it must be admitted that my notes on these performances of my gulls have only suggestive value.

SUMMARY.[1]

1. The Herring Gull is gregarious in habit, but it is also quarrelsome. Some of the fights are undoubtedly the consequence of invasions upon nesting precincts as stated by Herrick, but many are probably due to simple belligerency. This bird is often a great coward and may be routed by smaller birds, the crow for instance. The fights between adults have always been harmless, in my experience. Herring Gulls will fight fiercely for food when very hungry.

2. Herrick's conclusion that the frequent killing of the young by adults is the consequence of the instinct to guard a nesting precinct probably holds true in many cases. There is, however, some evidence that this is not always the explanation. Juvenals sometimes attack younger birds just as savagely as the adults do and in the same manner.

3. Other birds often nest safely even on a small island densely populated by breeding gulls.

[1] This section is not complete. It includes principally the more important conclusions of this paper.

4. The Herring Gull nests usually in places the most inaccessible to man that are available. The breeding place is usually on an island not inhabited by man. When seeking food or aside from the breeding season, this bird is frequently to be seen near human habitations on the coast or following vessels.

5. This gull is practically omnivorous in its habits according to the observations of various writers. Animal food is preferred, but other food may be eaten if the bird is hungry enough.

6. The Herring Gull does not dive for its food to any extent, and it never plunges vertically into the water as Terns do.

7. Breeding begins later in Green Bay and on Lake Michigan than at points on the Atlantic coast much farther north. This difference is very likely due to the accumulation of ice in the northern portions of the Great Lakes, which does not disappear until after the beginning of spring.

8. The nests are made of such material as is available, but fine materials are preferred.

9. The offspring are shaded by the parents on a hot day until they are strong enough to leave their nest and seek a shaded spot.

10. The young are given food which is first regurgitated upon the ground. There may be promiscuous feeding of young birds by adults not their parents.

11. Young Herring Gulls not yet old enough to fly usually hide when human intruders appear as is the case with other members of the order. Sometimes only the head may be hidden but the bird sits perfectly still. If removed from its hiding place, the hiding instinct is replaced by the instinct to run away. The juvenals able to fly join the adults at such a time, in the general panic, overhead, or they fly away some distance, usually to water.

12. Herring Gulls which I have had in my possession since they were in the nestling-down plumage were less mature in plumage at two years than is indicated by Dwight for birds of that age. It is my judgment that Herring Gulls rarely breed before they are three years old. All of the breeding Herring Gulls which I have seen were adults, so far as I could determine.

13. It has been my experience that the young are at least two months old before they begin to fly well.

14. I have given especial attention to the voice of the Herring

Gull. The most frequent sounds are the "challenge" and the "alarm" cry. A "mewing" sound is fairly common. These cries all involve characteristic positions, especially the "challenge" and "mew." The "challenge" seems to represent a variety of emotional states but, in general, excitement. The young have a characteristic squeal or chatter which is high pitched. It is used in calling for food or with a little modification when frightened. My captive gulls began to use what appeared to be a rudimentary "challenge" cry in September of their first year. I have heard this only a few times.

15. Both vision and hearing are keen in the Herring Gull, as appears to be the case with most birds.

16. It has been my experience that the Herring Gull has nearly as good darkness vision as man at least. During the breeding season or when food is best obtained at night, this bird is very active at night. My captive gulls will eat, if very hungry, when there is barely light enough for me to distinguish their food.

17. Food which is wet with solutions of either table salt or acids is rejected. My birds detect the presence of these solutions even when they are very weak to my taste.

18. Meat is eaten much more readily when it is fresh. The extent to which spoiled meat is tolerated varies directly with the degree of hunger.

19. It is a common practice of these birds to rinse food of uncertain palatableness or when it is dirty, in water.

20. Some evidence was obtained concerning the use of nerves of general sensation in testing food.

21. A positive reaction is shown to air currents. In a severe storm, gulls leave the ground and indulge in flight manœuvres.

22. The Herring Gull is sensitive to extremes in temperature. In very cold weather, the feet are kept protected by the plumage a large portion of the time.

23. There is a large amount of bathing, especially in hot weather. In very cold weather, no water seems to be required beyond that present in the food obtained.

AN ECOLOGICAL STUDY OF THE BREEDING BIRDS OF AN AREA NEAR CHOTEAU, MONT.

BY ARETAS A. SAUNDERS.

THE subject of the ecological associations of various forms of life has recently been given considerable attention. Most of the studies that have been made along this line, however, have been of plant life. Such studies of animal life, and particularly of bird life, have been comparatively few. This is probably because animals, and particularly birds, can move about from place to place, and are consequently less closely related to any one ecological association. In the breeding season, however, birds are fairly stationary, remaining in the vicinity of their nests. At this time they are confined to certain associations, which evidently depend on the character of their food and the locality chosen for their nesting sites. Sometimes a given species is confined to a single association and makes up a component part of its life. At other times a species may be found in several different associations, and may be less common in one than another. Occasionally a species nests in one association, but obtains its food largely in another. The study of these associations and the proportionate abundance of the different species of each is not only of great scientific interest, but also has an important bearing on the problem of obtaining an accurate census of our birds, and on the problems of the preservation of wild life.

In forestry, the study of the forest types, which is merely a simpler name for an ecological association of forest trees, is of great importance. In my work with the United States Forest Service in Montana, I was frequently called upon to study and map these types. Through this work I obtained a closer insight into these associations and their relations to other forms of life. In the local lists of birds which I have published for the different parts of Montana where my work has been located, I have attempted to describe the more important associations and list the species breeding in each. I have always hoped, however, for an opportunity to make a deeper study of these associations, showing the proportions of

the different species in each association, and the actual abundance of each species figured on an acreage basis. In the nesting season of 1912, I found such an opportunity. It was not in the mountain forests as I had hoped it would be, but in the vicinity of the little prairie town of Choteau, in Teton County, Montana. Here, with the exception of a short period from May 28 to June 5, I was confined to office work all through the spring and early summer, until August 5, when I finally left for a trip to the mountains. During this time I had my early mornings, evenings, Sundays and holidays free to explore the country in the immediate vicinity of Choteau, in search of birds and birds' nests.

On the southeast side of Choteau was an area, watered by a small stream known as Spring Creek, which I found to be an excellent place for birds. While I often explored other areas in the vicinity, I found this one to be the most accessible, and was on it almost daily throughout the spring and summer. Early in June, after most of the migration was over and when the nesting season for most species was just beginning, I decided to make an ecological study here. I blocked out, roughly, a rectangular area, which by later measurements I found to be about 1400 by 8250 feet, and to contain about 265 acres. On this area I started to determine as closely as I could, the actual number of birds of each species, breeding in each association. I could not very well hope to find all the nests, particularly of the ground nesting birds, but I found that I could get my numbers accurately by noting the number of male birds of a species in song. I found that during the period of early morning song, practically ever male bird was participating. By going over the area carefully each morning, and noting the numbers of birds of each species that were in song I soon had my census of the singing birds. The non-singing birds were most of them conspicuous for other reasons and easily found. It is possible that I may have missed a few birds that nested on the area. A Sharp-tailed Grouse might have had its nest in the cinquefoil brush, as several did in similar places outside the area. A Sora could have nested in one of the cattail sloughs and escaped my notice. It is also possible that there were more nests of the Mallard on the area than I found. With these exceptions I am quite certain that I counted all the nesting birds on the area. Of course I repeatedly

found stragglers and visitors on the area which were not nesting there, but my repeated visits served to show which birds belonged there regularly.

I found five separate ecological associations on the area. These representing most of the commoner ones of the prairie region of this part of Montana. Associations of this region not represented here are the prairie bench, the willow thicket, the rush slough, and the alkaline ponds and lakes. At the time of the study I used a rough sketch map to indicate the location of the various associations, not taking time to measure out and map each one accurately. The following fall I did this work, using a hand compass and pacing the distances, in the same manner in which forest type mapping is done, and divided the area among the different associations as follows.

Grass meadow	172 acres.
Cinquefoil brush	68 "
Cottonwood groves	18 "
Stream border	5 "
Cattail sloughs	2 "
Total	265 acres.

The grass meadows, as can be seen from the above figures, formed much the largest portion of the area. This association consists of flat stretches along stream valleys, having a rich, moist soil, and covered with a growth of tall, wild grasses and weeds. These are commonly cut over in this region for hay late in August, but never while birds are nesting, because growth is not fast enough to make a heavy crop so early in the year. In spite of the fact that this association covers the largest proportion of all in the area studied, the number of both species and individuals found in it was comparatively small. They are as follows.

Species.	No. of pairs.	Acreage per pair.
Western Savannah Sparrow	12	14
Western Meadowlark.	7	25
Bobolink.	4	43
Total	23	7.5

In giving the numbers of these species by pairs, I am assuming that every male bird found singing regularly on the area had a mate. This of course might not be the case. It was difficult to observe these birds except when they were singing, and I did not see females of any of the three species, regularly. I found only one nest in this habitat, that of a Western Meadowlark. These birds were not the only ones found in this association, however. Other species, nesting in other associations often obtained food in this one. These other species were Marsh Hawk, Short-eared Owl, Brewer's Blackbird, Thick-billed Red-wing, Cowbird, and Long-billed Curlew. All except the last are treated under other habitats, but the Curlews nested entirely outside the area studied.

The next association in size is that of the cinquefoil brush. This habitat is a peculiar one that I have not seen elsewhere in Montana. It occurs on flat areas, with a moist soil, but less rich than that of the grass meadow association, and usually very rocky, and liable to be somewhat alkaline. The principle vegetation is the Shrubby Cinquefoil (*Dasiophora fruticosa*) which grows in scattered clumps and patches, much in the same way that Sagebrush grows on the plains in other parts of Montana. Between the cinquefoil bushes is a growth of various species of grasses and weeds, and a few other shrubs, such as willows, wild rose, Wolfberry (*Symphoricarpus occidentalis*), Buffalo-berry (*Shepherdia argentea*), and Silver-berry (*Elæagnus argenteus*). Both species and individuals of birds are more numerous in this association than in the grass meadow, probably partly because the shrubs form better concealment for nesting sites. The numbers of species and individuals found in this association on the area studied are as follows:

Species.	No. of pairs.	Acreage per pair.
Brewer's Blackbird	22	3
Cowbird	4	17
Western Vesper Sparrow	4	17
Clay-colored Sparrow	3	22
Mallard	2	34
Western Yellow-throat	1	68
Marsh Hawk	1	68
Short-eared Owl.	1	68
Total	38	1.8

The large number of Brewer's Blackbirds was partially accounted for by the fact that a colony of thirteen pairs was nesting in the area. These birds did not live entirely in this association, but did much of their feeding in the grass meadow association. After their nesting was over, in July, they gathered into flocks with their young and were frequently found in the cottonwood groves. I have little doubt about the correctness of my count of this species. It was easy to observe all the forty-four individual birds at any time while they were nesting, if the whole brush area was covered thoroughly. This is because of the habit the birds have of protesting at anyone's intrusion near their nests, always keeping together in pairs, and following him about, hovering over his head, or perching conspicuously on the bushes. Whenever I entered the colony, I was always able to count the thirteen pairs of birds. Each pair kept so close together that I was able to count them in that way instead of individually. Ten of the nests of this species were actually found, nine in the colony, and one outside of it.

With the Cowbirds, I found considerable difficulty in getting a correct count. Since they had no fixed nests of their own, and wandered about from day to day, on and off the area, I found that an accurate count was out of the question. They were found most frequently in the cinquefoils, but also fed considerably in the grass meadows, and were occasionally seen in the cottonwoods, where observations showed that they laid their eggs frequently. My estimate of the numbers of this species, is merely the result of my judgment, after observations on the area throughout the nesting season. I believed six pair to be the average numbers found on the entire area during the nesting season, and counted four of these in the cinquefoil brush and two in the cottonwoods. I actually found but two eggs of the species in the cinquefoils, one in the nest of a Brewer's Blackbird, and the other in the nest of a Western Vesper Sparrow.

Both the Vesper and Clay-colored Sparrows were counted by noting the singing of the male birds as was the case with the species nesting in the grass meadows. The females were not commonly seen. One nest of the Vesper Sparrow was found and none of the Clay-colored Sparrow. Both birds of the pair of Western Yellowthroats were seen, and the male was observed in song frequently.

The nest was not found however. This bird I consider rare and unusual in this association, its proper place being in the willow thicket association, where it is fairly abundant.

The Mallards on the area should probably not be expressed as pairs. I found two nests of the species, under the cinquefoil bushes, but observed only the female birds, and then only when I flushed them from their nests. These birds evidently fed principally in the sloughs or along the creek. I have never observed the drake Mallard around the nest, and do not believe he is ever found there. I occasionally saw one or two drakes on a slough not far outside of this area, that may or may not have been mated to the ducks nesting on the area. I believe that the ducks left this area entirely with their broods as soon as the eggs hatched.

The nests belonging to the Marsh Hawks and Short-eared Owls were both found, and a detailed study of each made.[1] These birds lived on a much larger area than that included in this study and a correct proportion of their numbers to those of other species could be better obtained by a study of a much larger area, figuring their numbers on the basis of the square mile rather than the acre. They obtained food largely from the grass meadow association, as well as the cinquefoil brush.

The cottonwood grove association was even more densely populated with birds than the cinquefoil brush. This association occurs on flat areas along streams, in a soil quite similar to that of the cinquefoil brush association. In fact my observations show that the cottonwood grove is slowly encroaching upon the cinquefoil brush, the cottonwood trees seeding in under the shade of the cinquefoils, growing up through them, and ultimately crowding them out. This process forms an interesting ecological succession. The principal tree of the cottonwood groves in this part of Montana is the Narrow-leaved Cottonwood (*Populus angustifolia.*) It occurs both as grown trees, averaging fifty or sixty feet in height. and as younger trees forming a second layer under the older ones. The ground cover is largely tall shade loving herbs, and occasionally thick tangles of vines. The species found in the eighteen acres of this association were as follows.

[1] See Condor, Vol. XV, pp. 99 to 104 and 121 to 125.

Species.	No. of pairs.	Acres per pair.
Western Robin	8	2.25
Magpie	4	4.50
Yellow Warbler	4	4.50
Least Flycatcher	4	4.50
Western Wood Pewee	3	6.00
Western Goldfinch	3	6.00
Cowbird	2	9.00
Red-shafted Flicker	1	18.00
Western Chipping Sparrow	1	18.00
Cedar Waxwing	1	18.00
Black-headed Grosbeak	1	18.00
Western Nighthawk	1	18.00
Western Crow	1	18.00
Total	34	0.53

These figures show that the Robin is by far the most abundant bird of this association. I believe that my count of this species on the area is absolutely correct, for not only did I find the eight male birds, singing in their respective corners of the cottonwood grove each morning, but I also observed all eight of the females regularly, and found all of the eight nests. The Robin may have been a little more abundant on this particular area than it usually is in this habitat, but my observations in other places go to show that it is regularly the most abundant nesting bird of the cottonwood groves in all parts of Montana that I have visited.

The Magpie is an earlier nester than any of the other species. Its nests were easily found because of their bulk and conspicuousness and as all four were thus found, there is no doubt about the count being correct. These birds, however, left the area, after the nesting was over, which was before most of the other species were nesting. If they had not done so, perhaps the other species would not have nested so abundantly.

The next three species were all easily found because of the singing of the male birds, and I have little doubt about the correctness of the count. I found two nests of the Yellow Warbler, two of

the Least Flycatcher and one of the Western Wood Pewee. The Goldfinches evidently did not begin nesting until late in July, just before I left for the mountains and I found no nests. During June there were often more than three pairs on the area, there being a small band of birds roving about the vicinity that were evidently not mated. By July, however, the birds had evidently chosen mates and I was able to find the three pairs regularly.

Concerning the Cowbirds, the same remarks are true here as in the cinquefoil brush association. I found more eggs of this species in the cottonwoods, but did not observe the birds themselves there so frequently. I found nine eggs of this species in nests of this association; four in nests of the Yellow Warbler, two in a nest of the Chipping Sparrow, and one each in nests of the Least Flycatcher, Cedar Waxwing and Black-headed Grosbeak.

Of the remaining six species, I found the nests of all except the Nighthawk, so have undoubtedly a correct count of them. The Chipping Sparrow and Black-headed Grosbeak are usually rare in this association, the former being common only in the evergreen forests of the mountains in this region. The latter belongs more properly to the willow brush association, where it is much commoner than in cottonwood groves. The Cedar Waxwing often occurs in greater numbers in this association than my count of one pair would indicate, but since this species varies in abundance from year to year, and is very irregular in occurrence and nesting, my count per acre would no doubt be accurate if applied to a larger area.

I am not quite sure that the Nighthawks nested in this association. I found them there all through the latter part of June and all of July, and observed both birds, resting and sleeping on the horizontal limbs of the cottonwoods. I have never found a nest of this species in this association, however, but have always found them on the prairie benches, or in the mountains along barren ridge-tops. Why they frequented the cottonwoods so much unless they nested there, I cannot say, for there were no prairie benches within half a mile. These birds had certain favorite spots on the cottonwood limbs on which to rest, and after I had learned where these were I could locate both birds any day that I wished to. They were certainly mated, for their plumage showed that they were male and female, and I had observed courtship early in the season,

when another rival male was in the vicinity for a few days. I once observed a similar case of Nighthawks staying in a cottonwood grove through the breeding season, at Bozeman, Mont., and in that case saw the two young with the parents in August. I was then informed by a person whose information I had usually found to be unreliable, that Nighthawks often laid their eggs in a hollow spot on the upper surface of a horizontal cottonwood limb. Thinking this might possibly be the case with my Choteau birds, I climbed the trees, and examined the favorite perching places of these birds, but found nothing. There was a curious warfare between these Nighthawks and the Western Wood Pewees inhabiting this grove. The Nighthawks were fond of the same sort of horizontal limbs for perches that the Pewees chose for nesting sites, and whenever a Nighthawk attempted to alight on a limb near one of the Pewee's nests, the male Pewee drove it off with a ferocity that showed his relationship to the Kingbird.

Because I found certain birds nesting on the area, whose presence was due to the stream which crossed it, I found it best to add another association, the stream border. Perhaps this association could have been more easily figured in terms of length of the stream, but for the sake of uniformity in comparison with the other associations, I figured it as closely as I could in acres. This association consists mainly of the banks of the stream, a typical prairie stream, with deep pools and shallow rapids but no very swift places. It was bordered by occasional stony bars, and by steep clay banks three or four feet high. The banks were mostly grass grown, but there were a few clumps of young cottonwoods, buffalo berry bushes, and birches (*Betula fontinalis*). The birds found nesting along the stream border were as follows.

Species.	No. of pairs.	Acreage per pair.
Spotted Sandpiper	4	1.25
Kingbird	4	1.25
Killdeer	2	2.5
Kingfisher	1	5
Total	11	0.45

The Spotted Sandpipers nested on the stony bars along the edge of the stream, and I located three of the four nests. The Kill-

deers evidently nested in similar places, but I did not succeed in finding the nests. There was no doubt but that the nests were there, for each pair of birds was to be found regularly in a certain spot, protesting at my presence. The Kingfisher's nest was plainly visible in the steep clay bank of the creek. The Kingfishers themselves, evidently did not live entirely within the area in question, but fished the stream up and down for a considerable distance both above and below the area.

In other parts of Montana I had always classed the Kingbird as a member of the cottonwood grove association. Here however, these birds depart from their ordinary habit, and build their nests in bushes bordering the streams. I found all four nests, and not one was at an elevation of more than four feet. All were on the bank of the stream, and two were built so that they overhung the water, one of them only about three feet above the surface, and almost on a level with the bank. This nest was beside a pool in which the boys of Choteau go swimming. Several of the boys informed me that a nest had been in that particular spot for several years. This information was supplied at different times by different individuals, so I have no doubt that it is correct.

The cattail slough association consisted of two small sloughs, with water in them about eighteen inches deep, and grown thickly with cattails, I found but two species in this association. They are as follows.

Species	No. of pairs.	Acreage per pair.
Thick-billed Red-wing	5	0.4
Bittern	1	2.0
Total	6	0.67

I found all five nests of the Red-wings, one in one slough, and four in the other. The actual number of adult birds was less than ten, for the Red-wings showed evident signs of polygamy. The single nest in the first slough was guarded by a pair of birds, but the other four nests, though I saw all four females, evidently had but two males.

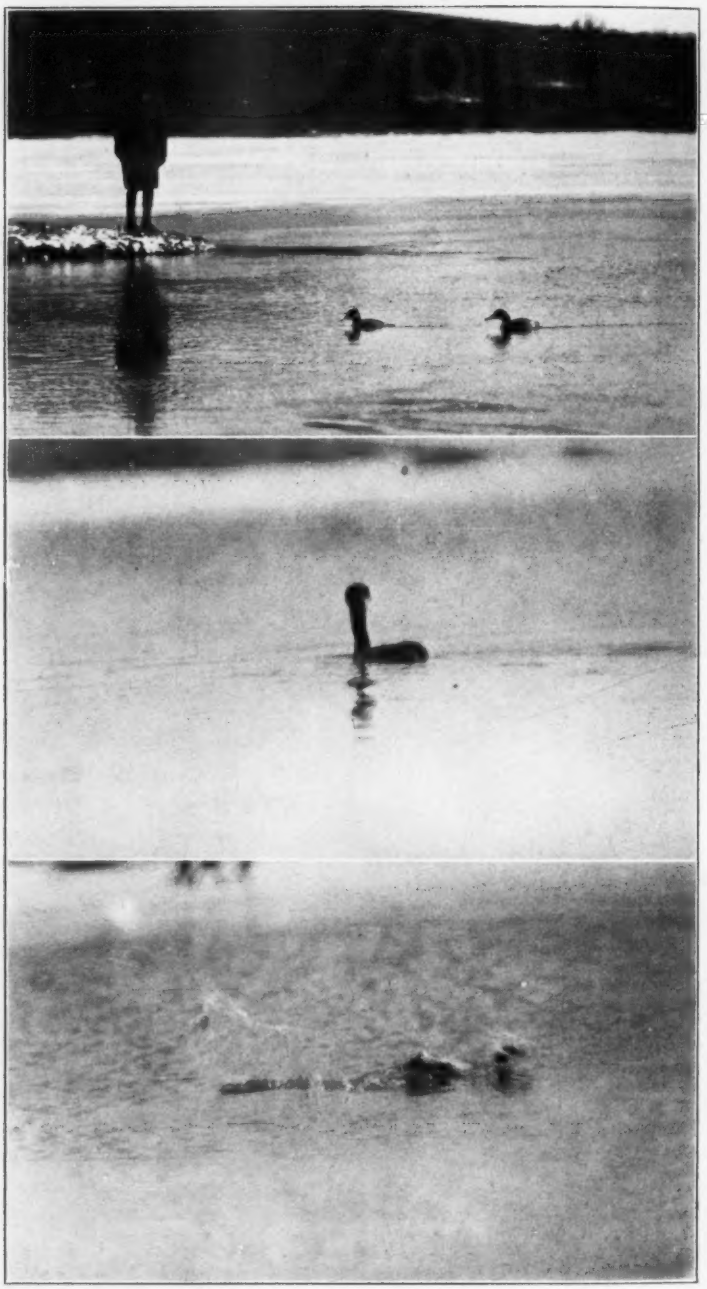
Whether the Bittern nested or not I could not be quite certain. I saw but one bird, which pumped every evening from one or the

other of the two sloughs, or occasionally from a third slough outside the area. I rather suspected that there was a Bittern's nest in the larger slough, with the four Red-wings, but I failed to find it.

Summing up the five different associations, we have 112 pairs of birds nesting on the area of 265 acres, making an average of 2.36 acres per pair. This however does not cover all of the birds found on the area during that time. Others went there occasionally and often stayed for several days. There were of course, many migrants in spring, and some of these remained during the first half of June. Other birds, evidently not migrants, that occurred more or less frequently, are as follows. A male Red-eyed Vireo stayed in the cottonwoods and sang for several days, late in June. He was not there long enough to have had a mate and nested. A Warbling Vireo that had a nest somewhere in the shade trees in Choteau, occasionally visited the cottonwoods. A Cooper's Hawk appeared one evening in July. I found it devouring the remains of a young Brewer's Blackbird. On May 25 a pair of Bronzed Grackles appeared. They were evidently mated and might have nested on the area, but I had not at that time determined to make an ecological study, and believing that they would jeopardize the safety of other nesting birds on the area, I collected them both. This is the only pair of these birds I have ever seen in this region, which must be at about the western limit of their range.

There may be some question concerning the value of such a study as I have presented. The figures given represent only the conditions on a small area, and more extensive studies will be necessary to prove whether or not they will hold true if applied to a larger tract. I hope to make further studies along this line, provided the opportunity is again presented. A census of breeding birds could probably be most accurately obtained by studies of associations on an acreage basis, supplemented by studies of a whole region, which would give the proportion of the area of the region covered by each association. The methods of work which I have used will probably be of some value to others who wish to make similar studies in the future, but they can undoubtedly be improved upon.

ENLARGEMENT OF PHOTOGRAPH OF HOLBŒLL'S GREBE IN ACT OF DIVING, WITH 'GHOST' OF EXPANDED WINGS INTENSIFIED. THE BODY APPEARS TO HAVE BEEN ABOUT WHERE THE DARK SPOT IS SEEN. THIS WOULD REDUCE THE APPARENT EXCESSIVE LENGTH OF WING.



1. BUFFLE-HEAD AND HOLBŒLL'S GREBE.
2. HOLBŒLL'S GREBE.
3. HOLBŒLL'S GREBE IN ACT OF DIVING WITH 'GHOST' OF EXPANDED WINGS.

DOES A GREBE SPREAD ITS WINGS JUST BEFORE DIVING?

BY VERDI BURTCH.

Plates XXI–XXII.

ON March 10, 1912, I got a remarkable photograph of a Holbœll's Grebe (*Colymbus holbœlli*) in the act of diving. It had been a very cold winter and Keuka Lake was frozen over early in January with the exception of the channel through the bar at Branchport, N. Y. Here there is a continual current flowing into and out of the harbor and this keeps the channel open even in the most severe weather. This open area is usually about ten to fifteen rods in diameter and here about six hundred wild ducks, Canvas-backs, American Scaups, American Golden-eyes and a single Buffle-head passed through the same ordeal as described by Alvin R. Cann in 'The Auk' for 1912, (Vol. XXIX, p. 437), while the conditions were the same as prevailed on Cayuga Lake where his observations were made. At the time of which I write the sole survivor of the entire flock of ducks was the little Buffle-head. We had just had several days of very severe cold and the open area was much restricted. This morning I found a Holbœll's Grebe with the Buffle-head. It dived as soon as I went near and when it came up uttered a "pup-pup-put" and dived again. It would stay up but a moment between the dives and sometimes stayed under water so long that I began to fear that it had come up under the ice but it eventually came up in the open area each time. As it was above water only a moment each time it was rather difficult to focus the camera and make an exposure before it dived again. Once when it came up quite close to me, I focused and released the shutter at the very instant it started to dive. The resulting picture shows a dark area representing the depression in the water where the Grebe sat at the beginning of the exposure, *the 'ghost' of its wings fully spread out behind* as it started to lunge forward and the Grebe itself nearly submerged a full length ahead. It would seem to me that the wings were instantly spread and closed again as the Grebe lunged forward, the

impression on the photographic plate being made during the instantaneous pause when the wings were fully spread before closing.

The figure at the bottom of Plate XXI shows a reproduction of the photograph actual size while Plate XXII is an enlargement with the 'ghost' of the wings intensified. The left wing appears to be too long but if we imagine the center of the bird's back to have been where the black spot appears on the photograph, which was no doubt its position, then the proportions would be about right.

BIRDS OF AUTAUGA AND MONTGOMERY COUNTIES, ALABAMA.

BY LEWIS S. GOLSAN AND ERNEST G. HOLT.

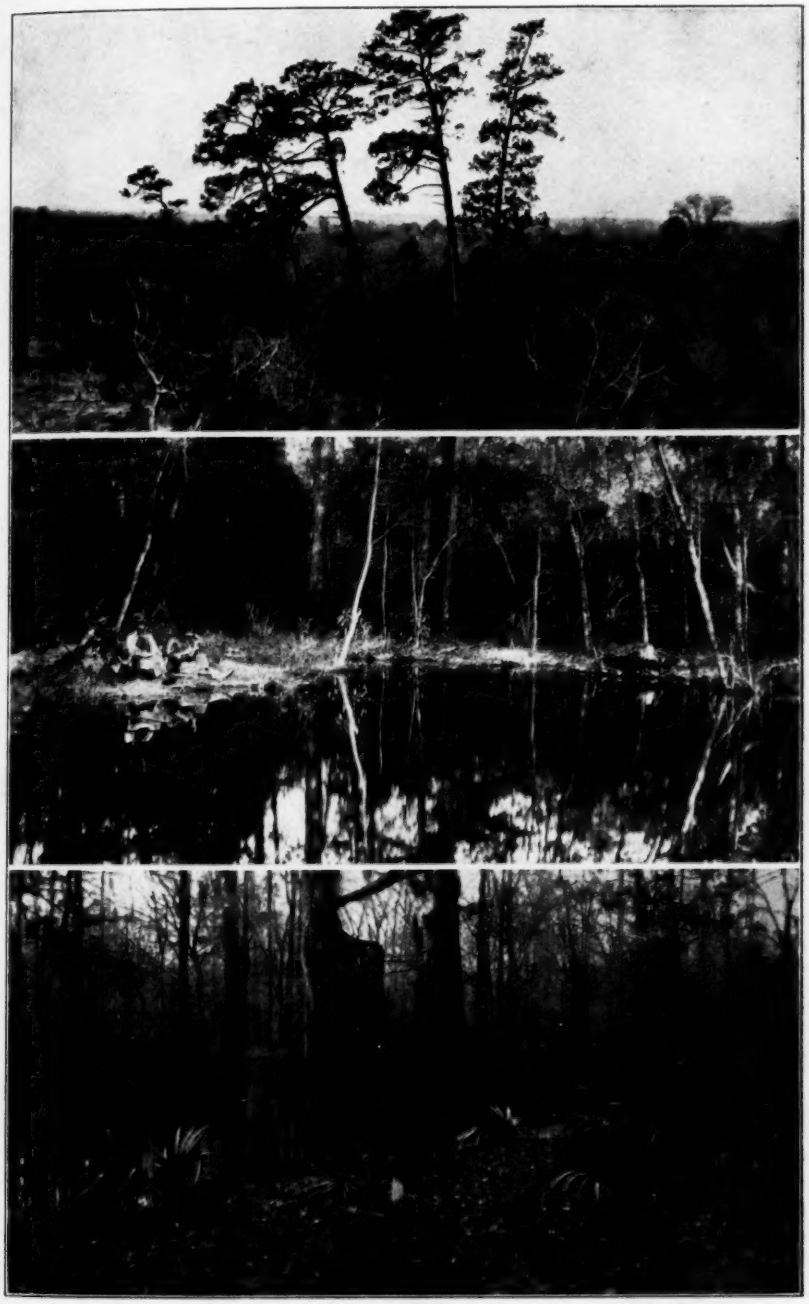
Plate XXIII.

THE counties of Autauga and Montgomery are just a little southeast of the center of the state of Alabama the southeast corner of Autauga and the northwest corner of Montgomery adjoining along the Alabama River.

This region lies well within the Austroriparian Fauna of the Lower Austral Zone; the most conspicuous breeding birds characterizing it being: *Chæmepelia p. terrestris, Catharista urubu, Dryobates v. auduboni, D. p. pubescens, D. borealis, Colaptes a. auratus, Antrostomus carolinensis, Sturnella m. argutula, Peucæa æ. bachmani, Guiraca c. cærulea, Lanius l. ludovicianus, Protonotaria citrea, Dendroica d. dominica, Geothlypis t. ignota, Mimus p. polyglottos,* and *Sitta pusilla.*

The mean temperature and precipitation at Montgomery (taken from Mohr's "Plant Life of Alabama," p. 97 are as follows:

		Annual.	Winter.	Spring.	Summer.	Fall.
Mean temperature	Degrees F.	63.3	50	66.6	80	65.4
Rainfall	Inches	51.4	17.1	16.74	12.22	8.54



1. LOOKING OVER BEAR SWAMP, PINUS PALUSTRIS IN FOREGROUND.
2. DEEP POOL IN BEAR SWAMP, TREES ARE PINUS TAEDA, MAGNOLIA VIRGINIANA, ILEX CORIACEA, ETC.
3. STREET LAKE, CATOMA SWAMP, SABAL GLABRA IN FOREGROUND, TAXODIUM DISTICHUM IN THE LAKE.

Maximum temperature 106 degrees in July, minimum 5 degrees below zero in February. Both these extremes, however, are very exceptional, the mercury seldom rising above 100 degrees or falling below 10 degrees.

Autauga County is covered by a belt of sands and pebbles, the Central Pine Belt, and is generally rolling or hilly, but the southern part of the county bordering the Alabama River is more or less level. It was in this southern portion that most of our work was done, principally in the country around Autaugaville, Booth and Prattville.

Autaugaville lies in a large flat tract extending northward from the Alabama River about six miles and then rising rather abruptly into rolling hills. Bear Swamp occupies most of this flat area. The swamp is heavily timbered with cypress (*Taxodium distichum*), 'gum' (*Nyssa sylvatica, Nyssa aquatica* and *Liquidambar styraciflua*), pine (*Pinus tæda*), beech (*Fagus americana*), magnolia (*Magnolia fætida* and *M. virginiana*), tulip (*Liriodendron tulipifera*) and is thick with an undergrowth of smaller trees and shrubs, such as swamp red bay (*Persea pubescens*), holly (*Ilex opaca* and *I. coriacea*), red maple (*Acer rubrum*) fetter bush (*Pieris nitida*) and 'possum haw' (*Viburnum nudum*), besides a variety of vines and briers (*Rubus argutus* and *Smilax bona-nox*) all too abundant for comfortable traveling and a little cane (*Arundinaria tecta*) which is disappearing. On the surrounding hills are found pine (*Pinus echinata, P. tæda* and *P. palustris*), mostly second growth, and 'scrub' oaks of several species (principally *Quercus minor* and *Q. marylandica* with an occasional *Q. pagodæfolia* and *Q. schneckii*), also an occasional hickory, black and sweet gum, honey locust (*Gleditsia triacanthos*) and quite a lot of sparkleberry (*Vaccinium arboreum*) and huckleberry. Grapes (*Vitis æstivalis, V. vulpina* and *V. rotundifolia*) are abundant. The once beautiful hills, covered until recent years with almost unbroken verdure, are now in places almost bare, and the whole face of Nature seems devastated by that most potent engine of destruction — the saw mill. The noble long-leaf pine is now being replaced by short-leaf and old-field second growth.

The character of the country surrounding Booth and Prattville is essentially the same as that of the Bear Swamp region, only the

swamps are confined to small areas along the streams. The plant associations of these swamps are practically identical with those of Bear Swamp. Around Prattville the hills contain more gravel and are more denuded than those surrounding Bear Swamp.

Montgomery County lies almost wholly within the Central Prairie Belt, a very fertile region of black, calcareous soils. The topography has very little relief, varying from level to gently rolling. In this county Barachias was the center of our observations, so we shall confine our descriptions to that immediate vicinity. The two principal features are the broad, undulating hay fields, destitute of trees except for an occasional straggler left upon some drain ditch, and Catoma Swamp. While most of the country is open, there are patches of woodland, some quite large, here and there, principally in low places or along some sluggish stream or slough.

These woods are chiefly deciduous with some scattered pine (*Pinus tæda* and *P. echinata*), for the most part being made up of oaks (*Quercus alba, Q. minor, Q. lyrata, Q. michauxii, Q. texana* or *schneckii, Q. digitata, Q. nigra, Q. phellos*, etc.), hickories (*Hicoria ovata, H. alba, H. myristicæformis*), hackberry (*Celtis mississippiensis*), elms, honey locust (*Gleditsia triacanthos*), etc., with an undergrowth of crabapple (*Pyrus angustifolia*), haws (*Cratægus*) of many species, dogwood (*Cornus florida*) and buckeye (*Æsculus pavia*). The Spanish moss (*Tillandsia usneoides*) which disappeared for a number of years is again locally abundant, hanging in long, graceful festoons even from the undergrowth. Along the ditches and sloughs cottonwood and willow are abundant and sycamore is by no means uncommon. Wherever an old unused field is found one is almost sure to find in it a patch of plums (*Prunus angustifolia*), and if it be near the swamp, sloes (*Prunus umbellata*) too. The hedges of osage orange (*Toxylon pomiferum*) which are everywhere, constitute another characteristic feature of this country.

Catoma Swamp is an almost unbroken stretch of timbered lowland lying along either bank of Catoma Creek, a tributary of the Alabama River. Although in the aggregate it covers a large amount of country it is usually very narrow, in some places scarcely more than half a mile wide. It differs from Bear Swamp principally in having a dryer, firmer soil, dense cane brakes (*Arundinaria*

macrosperma and *A. tecta*) and an abundance of palmetto (*Sabal glabra*).

The principal trees are cypress (*Taxodium distichum*) hornbeam (*Carpinus caroliniana*), 'gums' (*Liquidambar styraciflua* and *Nyssa sylvatica*), sycamore (*Platanus occidentalis*), holly (*Ilex opaca*), dogwood (*Cornus florida*) and persimmon (*Diospyros virginiana*). Vines and briers of many kinds are abundant.

The following list is based on sporadic observations covering a number of years, principally during the breeding seasons. As no systematic study has been attempted (as evidenced by the lack of migration data) until very recently, of course it cannot be expected that the list is complete or that the data given are conclusive; so we submit the list for just what it may be worth, hoping that it may prove of some interest, treating as it does of the avifauna of a region so little studied by ornithologists.

Neither of us can claim the distinction of being an ornithologist and until recently, we have centered our attention upon oölogy, endeavoring to make as complete a collection as possible of the eggs of birds breeding in this neighborhood. Consequently the data given upon breeding birds are more complete, and we have in most cases included nesting data for each county. The most complete data available, however, are from Autauga County.

Ornithological knowledge among the hunters of this section is generally vague and unreliable and besides ourselves we know of no one in either county who takes an active interest in the study of birds. We have thus been forced to rely almost entirely upon our own notes and have used reports from others only when we were reasonably sure of their accuracy.

We are greatly indebted to Mr. Arthur H. Howell, Assistant Biologist, U. S. Bureau of Biological Survey, for many valuable suggestions as well as for reading the manuscript; and to Mr. H. C. Oberholser, Ornithologist of the Survey, for identification of specimens.

The vernacular names in quotations are those by which the birds are known locally. Except where specifically stated to the contrary all notes refer to both counties.

1. **Podilymbus podiceps.** PIED-BILLED GREBE. 'DIDAPPER.'—One or two pairs occasionally to be found in favorable ponds at any season

of the year. Although we have found no nests, the birds have been observed throughout the breeding season and we think it safe to assume that they breed here. They have been almost exterminated by so-called sportsmen.

2. **Gavia immer**. LOON.— One taken near Prattville in Autauga Co., winter of 1889 or 1890, and one at Barachias in April, 1905. A few reported to occur on the Alabama River in winter.

3. **Sterna antillarum**. LEAST TERN.— The only record we have of the Least Tern in this neighborhood is from "A. M. R." in Forest and Stream, Vol. XX, No. 17, p. 323: "Two specimens seen in Montgomery County, one of which I obtained and carefully identified. It was a young male and had probably strayed up from the coast."

4. **Anhinga anhinga**. WATER TURKEY.— These birds have been observed in the more inaccessible parts of Bear Swamp, but none in very recent years. A pair were seen in Bear Swamp in July, 1883, and others were frequently killed in fall prior to this date.

5. **Phalacrocorax auritus** subsp. CORMORANT.— Seven seen and one killed on a mill-pond near Bear Swamp, in July, 1909.

6. **Fregata aquila**. MAN-O'-WAR-BIRD.— One found dead about three miles north of Prattville, after a severe storm, about 1905 or 1906.

7. **Lophodytes cucullatus**. HOODED MERGANSER. 'SUMMER DUCK.'— Occasionally seen in mill ponds and in Bear Swamp. Permanent resident. No nests discovered but broods of young observed on several occasions. Also reported to occur on the Alabama River.

8. **Anas platyrhynchos**. MALLARD. 'GREEN-HEAD.' — Winters in small numbers on rivers, creeks and ponds. Reported as the commonest of our winter ducks.

9. **Anas rubripes**. BLACK DUCK. 'BLACK MALLARD.' — Occurs in some numbers during winter on the Alabama River and is frequently taken by gunners.

10. **Nettion carolinense**. GREEN-WINGED TEAL.— Reported to occur in small numbers on the Alabama River in winter. Fine male taken January 9, 1913, at Barachias on a small creek at the edge of heavy timber.

11. **Querquedula discors**. BLUE-WINGED TEAL.— Reported by hunters as the first of the ducks to arrive from the north. Common on the Alabama River, where about 200 were reported, Sept. 20, 1912.

12. **Dafila acuta**. PINTAIL.— Reported by hunters as a fall and spring migrant on the Alabama River, a few remaining through winter.

13. **Aix sponsa**. WOOD DUCK. 'SUMMER DUCK.' — Observed throughout the breeding season, in small numbers, in swamps, marshes and ponds. Reported also on the Alabama River.

14. **Marila valisineria**. CANVAS-BACK.— Occasionally seen during winter in Autauga Co. Reported as occurring on the Alabama River but uncommon.

15. **Marila collaris**. RING-NECKED DUCK.— Winters in small numbers on creeks, ponds, sloughs, etc. (Autauga Co.).

16. **Branta canadensis canadensis**. CANADA GOOSE. 'WILD GOOSE.' — Observed in considerable numbers during migrations. Occasionally taken by hunters on the Alabama River and reported as occurring in small numbers throughout the winter.

17. **Botaurus lentiginosus**. BITTERN.— Winters in small numbers, more abundant in late winter and early spring. Observed as late as May 28th in marshes near Autaugaville — possibly breeding.

18. **Ixobrychus exilis**. LEAST BITTERN — Observed about the Bear Swamp region.

19. **Ardea herodias herodias**. GREAT BLUE HERON. 'BIG BLUE CRANE.' — Permanent resident and tolerably common in Bear Swamp and marshes near the Alabama River. Also recorded from Catoma Swamp.

20. **Hydranassa tricolor ruficollis.** LOUISIANA HERON. 'LITTLE CRANE.' — Uncommon summer resident on the Alabama River and adjacent marshes (Autauga Co.).

21. **Florida cærulea**. LITTLE BLUE HERON. 'LITTLE BLUE CRANE.' — Summer resident on ponds, creeks and marshes and in Bear Swamp. Slightly more numerous than the Louisiana Heron (Autauga Co.).

22. **Butorides virescens virescens**. GREEN HERON. 'FLY-UP-THE-CREEK.' — Common summer resident. Found in slightly more open country than the preceding herons. Breeding record: May 7, 1911, swampy pasture near Prattville; nest small, frail platform of sticks on limb, and against body of tree; 10 ft. from ground in pine. Bird took flight when approached within 20 yards. Three newly-hatched young and one pipped egg. (L. S. G.)

23. **Nycticorax nycticorax nævius**. BLACK-CROWNED NIGHT HERON. — One observed breeding in Yellow-crowned rookery, April 23, 1911. Nest of sticks, typical heron's platform, 70 ft. (estimated) up in crotch of tall cypress in lagoon near Alabama River, Autauga Co. (L. S. G.)

24. **Nyctanassa violacea.** YELLOW-CROWNED NIGHT HERON.— Common summer resident, breeding abundantly in small rookeries in Bear Swamp and swamps along Alabama River. Breeding records Apr. 12, 1908, Bear Swamp; nest a bulky platform of large sticks, no lining, 5 ft. out on first limb of a black gum, 50 ft. above the water. The tree stood in remote part of swamp among many other gums and cypresses in open water, i. e., free from undergrowth. Five slightly incubated eggs. (E. G. H.) May 8, 1909, Bear Swamp; nest the usual platform of sticks, 8 ft. out on limb of tupelo gum, 30 ft. above water 3 ft. deep; five nearly hatched eggs covered with gnats. One other occupied nest about 20 paces away. (L. S. G.) April 23, 1911, swamp near the Alabama River, Autauga Co.; nest large platform of sticks 40 ft. up in large second growth cypress, in lagoon about 3 ft. deep, thickly set with trees of same size and species; three fresh eggs. Twenty-five or more occupied nests in immediate vicinity, including one of the Black-crowned. (L. S. G.) The scenes in these rookeries are weird, not to say gruesome, especially in late afternoon when

the dark, coffee-colored waters are lighted for a little while by the rays of the setting sun slanting down between tall cypresses and gums, and the death-like stillness is broken by the wild, unearthly " quwarks " of the herons.

25. **Grus americana**. WHOOPING CRANE.— In late November or early December, 1899, Mr. Thomas Hook saw five or six of these birds in marshy meadows and swamps on a creek near the Alabama River, 6 miles from Prattville.

26. **Rallus elegans**. KING RAIL. 'MARSH HEN.' — Found breeding in both Autauga and Montgomery Counties. Not well known on account of its retiring habits. Data: May 30, 1908, Barachias; nest a slightly concave mass of *Sorghum halepense*, 8 in. in diameter and about one inch deep, woven together about stalks of high grass on ditch bank in open hay field; ditch about 2 ft. deep, containing only a few inches of water; eight nearly hatched eggs. (E. G. H.) June 1, 1912, Autauga Co., near Autaugaville; nest of coarse grass in slight depression of ditch bank in marshy old field within 10 inches of water 18 inches deep, and 4 inches above the water; twelve eggs moderately incubated. (L. S. G.)

27. **Porzana carolina**. SORA.— Frequently observed in early spring, One specimen seen June 1, 1912, in the edge of Bear Swamp (Autauga Co.).

28. **Coturnicops noveboracensis**. YELLOW RAIL.— Frequently found; common in fall and early spring on open hay fields at Barachias.

29. **Ionornis martinicus**. PURPLE GALLINULE.— One specimen taken in summer, some years ago, in Autauga Co.

30. **Fulica americana**. COOT.— A specimen taken in 1911, about May 20th, near Swift Creek, Autauga Co. Reported by hunters as abundant during fall and spring migrations on the Alabama River, a few remaining throughout the winter.

31. **Philohela minor**. WOODCOCK. 'SWAMP PARTRIDGE.' 'SNIPE.' — Permanent resident in rather small numbers in Autauga Co., inhabiting marshes, swamps and wet pastures. Rare in Montgomery Co., though apparently increasing. Mr. C. N. Hinderer reported 9 birds near Montgomery on January 5, 1913 and 20 in the same vicinity on January 12th. Several were taken each time.

Jan. 25, 1913, we observed a bird giving its remarkable flight song, above an open flat near Bear Swamp. Three were performing at once. Jan. 28 I had a better opportunity to observe this phenomenon, alone, down by the swamp in a small, bushy field. After a series of " scapes," each preceded by a kind of hiccough, the bird would rise on rapidly beating wings, in a spiral, the wings making a whistling or " chippering " sound that at first I attributed to the bird's vocal organs. Just before its downward plunge the bird would chirp rapidly, much after the manner of a little chicken; then it would drop suddenly to the ground, almost to the same spot it had just left and begin the performance all over again. As the birds do not come out until after sunset, almost night in fact, it is very difficult to see them even when outlined against the western sky. (E. G. H.)

32. **Gallinago delicata**. WILSON'S SNIPE. 'SNIPE.' — Very com-

mon during March and April in open, marshy fields of Montgomery Co. Small numbers spend the entire winter. Late in the afternoon of Jan. 9, 1914, when driving home from the Barachias station, I saw a snipe fly into the telephone wires beside the road and fall gasping to the ground. I ran and picked it up and discovered that it had broken one of its neck vertebræ. (E. G. H.)

33. **Pisobia maculata**. PECTORAL SANDPIPER.— Four taken at Barachias, March 30, 1913.

34. **Pisobia minutilla**. LEAST SANDPIPER.— Two taken at Barachias, March 30, 1913, in a boggy pasture.

35. **Ereunetes pusillus**. SEMIPALMATED SANDPIPER.— One taken while feeding around a pool from an overflowing well at Bear Swamp, May 23, 1913.

36. **Totanus melanoleucus**. GREATER YELLOW-LEGS.— Several taken near Montgomery by Mr. C. N. Hinderer.

37. **Helodromas solitarius solitarius**. SOLITARY SANDPIPER.— A male taken in a pasture at Barachias, April 22, 1913, and one taken near Bear Swamp, May 23, 1913.

38. **Bartramia longicauda**. UPLAND PLOVER.— Seen occasionally in Autauga Co. Regular spring migrant in Montgomery Co., but diminishing very rapidly. Stragglers have been reported during the fall months. One pair once observed to remain throughout the entire summer on a large hay farm at Barachias. One recorded at Barachias, March 7, 1913 — an exceptionally early record.

39. **Actitis macularia**. SPOTTED SANDPIPER.— Tolerably common summer resident in swamps and adjoining low fields (Autauga Co.).

40. **Oxyechus vociferus**. KILLDEER. 'KILLDEE.' — Common permanent resident, more abundant in winter. In summer the vicinity of water is always preferred; in winter, found in almost any open country, old fields preferred. Quite common in winter in small flocks on open hay fields of Montgomery Co. The Killdeer is apparently a very light sleeper as its note can be occasionally heard out on the wintry, wind-swept fields at almost any hour of the night.

41. **Colinus virginianus virginianus**. BOB-WHITE. 'PARTRIDGE.' "QUAIL."— Abundant permanent resident. Breeding records: May 30, 1909, Autauga Co., near Prattville; eleven fresh eggs in depression in ground under scrub oak bushes at foot of oak sapling stump on scrubby hillside; lined with leaves and pine needles. (E. G. H.). Sept. 19, 1909, Autauga Co., near Autaugaville; eleven fresh eggs in arched nest of grasses on ground in grassy pea-field. (L. S. G.)

42. **Meleagris gallopavo silvestris**. WILD TURKEY.— Rather rare permanent resident. Numbers greatly reduced during recent years. Habitat: Hills and swamps alike, breeding principally on hills (Autauga Co.). Formerly common in Catoma Swamp, Montgomery Co., now reported scarce throughout the county.

43. **Ectopistes migratorius**. PASSENGER PIGEON. 'WILD PIG-

EON.' — None recorded within 35 years, and scarce even before that time. However, they once occurred in numbers in both counties. Last seen about spring of 1878.

44. **Zenaidura macroura carolinensis**. MOURNING DOVE. 'DOVE.' — Abundant permanent resident but not so numerous as formerly. Breeding records: April 10, 1908, Barachias; two slightly incubated eggs on a frail platform of pine twigs and needles on first horizontal branch of large pine 10 ft. above ground and about 15 ft. from trunk of tree. (E. G. H.). July 8, 1909, near Autaugaville; one fresh egg (set incomplete) on platform of grass, pine needles and a few feathers, 40 ft. up in pine and 12 ft. out on branch. Open hillside. (L. S. G.)

45. **Chæmepelia passerina terrestris.** GROUND DOVE.— Tolerably common in low lands between Bear Swamp and the Alabama River. Occasionally seen elsewhere in Autauga Co. Small numbers reported in Montgomery Co. Nesting data: May 28, 1911, Autauga Co., on Alabama River near Autaugaville; two slightly incubated eggs in frail nest of weed stems and grass in depression beside clod of earth in cultivated field. Bird almost touched before leaving nest. (L. S. G.)

46. **Cathartes aura septentrionalis**. TURKEY VULTURE. "TURKEY BUZZARD." — Common permanent resident, but not nearly so numerous as the Black Vulture. Breeding records: March 31, 1894, near Prattville; two slightly incubated eggs in old pine log near small stream flowing through wooded ravine. (L. S. G.) April 11, 1909, Bear Swamp; two moderately incubated eggs deposited in depression in rotten wood on ground inside of hollow giant tulip tree in thick swamp. Old bird came out with rush and vomited as it took wing at entrance. (L. S. G.) It is a source of never ending pleasure on a summer day, to lie on my back in the shade of a pine on some high hill and watch these majestic fliers mount higher and higher, in wide, easy circles, until a mere speck against the blue vault above, or lost to view entirely. I have seen the Black Vulture rise to such a height as to be barely visible with a six-power binocular. The two species are characteristic birds of our southern landscape. (E.G.H.)

47. **Catharista urubu**. BLACK VULTURE. 'CARRION CROW.'— Abundant permanent resident. Nests containing eggs discovered between extreme dates of March 10 and May 8. Many nesting data for both counties. April 8, 1906, Barachias; two slightly incubated eggs deposited on debris at bottom of hollow stump about 8 ft. high in midst of briers and palmettos in swamp pasture. The chimney-like hollow was the only approach to the nest. (E. G. H.). April 13, 1909, Bear Swamp; two eggs containing very large embryos, deposited on ground between trunks of two pines and a white bay (*Magnolia virginiana*) in thick swamp. (E. G. H.) The Black Vulture is not so graceful a flier as the Turkey Vulture, but is the more powerful of the two, and whenever a dispute arises, perhaps over some savory morsel, the Turkey Vulture always comes out second best.

48. **Elanoides forficatus**. SWALLOW-TAILED KITE.— One seen May 1, 1909, at Barachias, flying steadily southwestward.

49. **Ictinia mississippiensis.** MISSISSIPPI KITE.— A small number appeared as summer residents in the vicinity of Bear Swamp between the years 1886 and 1889. Apparently killed out since that time.

50. **Circus hudsonius.** MARSH HAWK. 'RABBIT HAWK.' — Common winter resident. A typical winter bird of the broad hay fields of Montgomery County and one of the most difficult to approach.

51. **Accipiter velox.** SHARP-SHINNED HAWK. 'LITTLE BLUE DARTER.' — Permanent resident, much more in evidence in early spring.

52. **Accipiter cooperi.** COOPER'S HAWK. 'BIG BLUE DARTER.'— Tolerably common permanent resident, also much in evidence in early spring about poultry yards.

53. **Buteo borealis borealis.** RED-TAILED HAWK. 'BIG CHICKEN HAWK.' — Tolerably common permanent resident. Breeding records: April 9, 1909, Bear Swamp; one slightly incubated egg in large nest of large sticks, lined with rootlets and trash, about 54 ft. up in crotch of large pine; nest 3 ft. in diameter outside; birds very shy. (L. S. G.) Set of two eggs taken at Barachias, Montgomery Co., but data lost.

54. **Buteo lineatus lineatus.** RED-SHOULDERED HAWK.— This form occurs with us in winter. A female (specimen No. 189) in the State University Museum was taken in Hale County in August.

55. **Buteo lineatus alleni.** FLORIDA RED-SHOULDERED HAWK. 'CHICKEN HAWK.' — Common permanent resident. Much more numerous than the Red-tail. Breeding records: Mar. 28, 1909, near Prattville; three very slightly incubated eggs in nest of large sticks, lined with green pine needles, placed 36 ft. from ground in crotch of hickory leaning out over wooded hillside. Nest measured: inside, 7½ in. diameter and 2½ in. deep; outside, 24 in. widest diameter. (E. G. H.) April 11, 1909, Catoma Swamp, near Barachias; nest of large sticks, lined with moss, bark and green leaves, placed in crotch of large water oak about 50 ft. up. Inside dimensions: 8 in. in diameter by 2 in. deep; outside, 11×17 in. Contained one pipped egg and one young about two days old, covered with buffy down. (E. G. H.).

56. **Buteo platypterus.** BROAD-WINGED HAWK. 'CHICKEN HAWK.' — Uncommon permanent resident. Breeding record: May 22, 1912, near Booth; two eggs with well developed embryos, in large nest of sticks, lined with grass, rootlets, etc., about 25 ft. up in crotch of short-leaf pine on barren hillside. (L. S. G.)

57. **Haliæetus leucocephalus leucocephalus.** BALD EAGLE.— Occurs as a rare, irregular visitant. On Dec. 18, 1913, while exploring Bear Swamp we came unexpectedly upon a bunch of about a dozen Black Vultures, behaving strangely, in a pine thicket on the edge of an old beaver pond. We noticed a great commotion, which at first we attributed to our presence, but the birds instead of rising and flying away, kept flying about among the branches of the pines and one individual dropped to the ground and literally "took to his heels," disappearing in the thick brush. Then, just as it took flight, we noticed among them a much larger bird,

which we instantly recognized by its tail and great alar expanse, as a Bald Eagle. Perhaps it had intended making a meal of one of the vultures or forcing them to disgorge — there's no accounting for tastes! A former resident of these parts used to tell of once having seen an eagle take a "buzzard" on the wing, at this same place (about 1880). Ours is the first record of a Bald Eagle in this vicinity in perhaps fifteen years.

58. **Falco sparverius** subsp. SPARROW HAWK.— Very common permanent resident. Breeding record: April 11, 1910, near Autaugaville; four fresh eggs, deposited on debris at bottom of nest cavity, 6 in. deep, used previous season by Flicker; hole 20 ft. up in dead pine in cultivated field. (L. S. G.) This is one of the characteristic birds of the broad, open hay lands of Montgomery Co., where it undoubtedly does much good by preying upon the hordes of grasshoppers that overrun the fields. Both subspecies *sparverius* and *paulus* undoubtedly occur here though we cannot substantiate this statement with our own records. *F. s. paulus* is probably the breeding bird.

59. **Pandion haliaëtus carolinensis**. OSPREY.— Rare. Individuals occasionally seen throughout the year at Rawlinson's Pond, near Autaugaville.

60. **Aluco pratincola**. BARN OWL.— Owing to its strictly nocturnal habits, this bird is not well known, and so far has not been recorded in Autauga Co. It has occasionally been taken at Barachias. On Jan. 8, 1912, an old, hollow oak, standing in a grove not over 200 yds. from a residence at Barachias was cut, and three young, about 5 or 6 weeks old, discovered in the cavity which was littered with quantities of pellets — bones, hair, etc., of rats and mice.

61. **Asio wilsonianus**. LONG-EARED OWL.— Seen in 1909 and heard in 1911, near Bear Swamp.

62. **Asio flammeus**. SHORT-EARED OWL.— Occasionally common in open hay fields at Barachias, usually during fall.

63. **Strix varia alleni**. FLORIDA BARRED OWL.— 'SWAMP OWL.' "HOOTING OWL." — Very common permanent resident. Nesting data: March 27, 1910, east end of Bear Swamp; one heavily incubated egg deposited on debris at bottom of large cavity, 4 in. deep, 25 ft. up in large post oak. (L. S. G.)

64. **Otus asio floridanus**. FLORIDA SCREECH OWL. 'SQUINCH OWL.' 'DEATH OWL.' — Tolerably common permanent resident, locally abundant. Breeding records: April 10, 1908, Barachias; four moderately incubated eggs, deposited on debris at bottom of cavity, 12 in. deep, 20 ft. up in old willow tree. Tree on ditch bank in open oat-field about 200 yards from residence. (E. G. H.) April 10, 1910, near Prattville; three moderately-incubated eggs deposited in old woodpecker's nest-cavity 12½ ft. from ground in old pine snag on wooded hillside. Cavity contained a few woodpecker's feathers. (L. S. G.)

65. **Bubo virginianus virginianus**. GREAT HORNED OWL. 'HORN OWL.' 'PINEY-WOODS OWL.' — Common permanent resident but not

nearly so abundant as the Barred Owl. Breeding record: Jan. 30, 1897; two nearly hatched eggs in old crow or hawk-nest, 50 ft. above ground in second growth pine thicket, near Prattville. (L. S. G.)

66. **Coccyzus americanus americanus**. YELLOW-BILLED CUCKOO. 'RAIN CROW.' — Very common summer resident. Breeding records: Barachias, May 19, 1907; four pin-feathered young in shallow nest of sticks in haw thicket. (E. G. H.) Booth, August 11, 1912; nest 25 ft. up in small pine, beside road in woods. Bird knocked out one egg, containing well developed embryo, as observer passed under tree. (L. S. G.)

67. **Coccyzus erythrophthalmus**. BLACK-BILLED CUCKOO.— Known only as a migrant. One taken, Oct. 16, 1898, near Bear Swamp, Autauga Co. Also taken in Montgomery Co. One seen at Barachias, May 2, 1913.

68. **Ceryle alcyon alcyon**. BELTED KINGFISHER. 'KINGFISHER.' — Moderately common permanent resident, in favorable localities. Breeding record: Autauga Co., near Autaugaville, April 16, 1910; two fresh eggs (set incomplete) deposited in chamber at end of 4 ft. tunnel in sandy bank of old road; tunnel 3 ft. below surface; bird removed from nest by hand, forming quite an attachment for the hand. Tunnel contained a small quantity of fish bones and scales. (L. S. G.)

69. **Dryobates villosus auduboni**. SOUTHERN HAIRY WOODPECKER. 'SAPSUCKER.' — Moderately common permanent resident. Breeding record: Prattville, March 31, 1894; four slightly incubated eggs in nest cavity excavated 15 ft. up in dead China tree in farm yard. (L. S. G.)

70. **Dryobates pubescens pubescens**. SOUTHERN DOWNY WOODPECKER. 'LITTLE SAPSUCKER.' — Tolerably common permanent resident. A quiet, unsuspicious bird, often allowing a very close approach. Breeding record: Prattville, April 2, 1894; four nearly fresh eggs in cavity excavated by bird, 10 ft. above ground in China tree in farm yard. (L.S.G.)

71. **Dryobates borealis**. RED-COCKADED WOODPECKER. 'SAPSUCKER.' — Locally abundant, especially in pine woods (Autauga Co.). As far as we have been able to observe, this species invariably nests in live pines. Breeding record: June 4, 1895; four eggs, incubation slight, in decayed heart of live pine on wooded hillside, near Prattville, Autauga Co. (L. S. G.). Rather an uncommon species in Montgomery County, probably because of the scarcity of large tracts of pine timber.

72. **Sphyrapicus varius varius**. YELLOW-BELLIED SAPSUCKER. 'SAPSUCKER.' — Tolerably common winter resident.

73. **Phlœotomus pileatus pileatus**. PILEATED WOODPECKER. 'LORD-GOD.' 'WOODCOCK.' 'INDIAN HEN.' — Rare permanent resident, locally common in Bear Swamp. One pair recorded in Catoma Swamp, Feb. 4, 1906. Breeding record: Bear Swamp, April 14, 1909; four heavily incubated eggs deposited on rotten wood at bottom of hole in rotten pine snag about 40 ft. high, in almost impenetrable brier patch (*Rubus*) in one of most inaccessible parts of the swamp; hole about 18 in. deep and 3½ in. in diameter at opening, widened to 7 or 8 in. at bottom; entrance 29 ft. above ground. (E. G. H.)

74. **Melanerpes erythrocephalus**. RED-HEADED WOODPECKER. 'RED-HEAD.' — Abundant summer resident, a few commonly remaining through the winter in Autauga Co. Winters in much larger numbers in Montgomery Co. Typical habitat: Dead timber in fields and new grounds, and more open woods or groves. Breeding record: Four miles from Prattville, May 30, 1909; four very slightly incubated eggs deposited in hole, excavated by the bird, about 20 ft. up in dead pine in new ground. (E.G.H.)

75. **Centurus carolinus**. RED-BELLIED WOODPECKER. 'GUINEA SAPSUCKER.' — Common permanent resident. More strictly a bird of the heavy woods than most of the other woodpeckers. Breeding record: Near Prattville, July 11, 1909; three fresh eggs (set evidently incomplete) deposited upon debris at bottom of cavity, 10 in. deep, excavated by the birds, 50 ft. up in decayed pine standing on cleared hillside. (L. S. G.) Several sets taken as early as May.

76. **Colaptes auratus auratus**. FLICKER. 'YELLOW HAMMER.' — Very common permanent resident. Frequently found feeding on the ground in winter in company with blackbirds and meadowlarks. Breeding record: Barachias, April 20, 1908; nest cavity a large hole about 18 in. deep, excavated by the birds, about 23 ft. up in dead top of willow standing on ditch-bank in open oat-field. The nest was torn into when under construction, but nothing daunted, the birds finished it and deposited two eggs upon the chips at bottom before it was noticed again. Waiting until another was laid, one egg was removed, leaving two in nest, April 20. Four other eggs removed, one each on 21st, 22nd, 23rd and 24th. April 24th there were only two eggs in nest and one was taken, leaving one, but on the 27th nest was found empty. Altogether six eggs were laid. (E. G. H.)

77. **Colaptes auratus luteus**. NORTHERN FLICKER.— Common winter resident.

78. **Antrostomus carolinensis**. CHUCK-WILL'S WIDOW. 'WHIP-POOR-WILL.' — Toleraby common summer resident, especially in pine woods country. Breeding record: Autauga Co., near Autaugaville, May 9, 1909; two fresh eggs deposited upon oak leaves on hillside covered with scrub oak; set just completed. (L. S. G.)

79. **Antrostomus vociferus vociferus**. WHIP-POOR-WILL.— Known only as an uncommon migrant in Autauga County.

80. **Chordeiles virginianus chapmani**. FLORIDA NIGHTHAWK. 'BULL BAT.' — Common summer resident, very abundant in early fall. Breeding record: Autauga Co. near Autaugaville, May 16, 1909; two fresh eggs deposited on bare, gravelly ground between two bunches of broom sedge, in sparse growth of pine and scrub oak on high hill. (L. S. G.) Subspecies *virginianus* certainly should occur during migration, but we have taken no specimens.

81. **Chætura pelagica**. CHIMNEY SWIFT. 'CHIMNEY SWEEP.' — Abundant summer resident, breeding only in chimneys, so far as we know. Especially abundant in early fall. Breeding record: 3½ miles from Montgomery, May 18, 1905; three fresh eggs (set probably incomplete) depos-

ited in nest of small twigs attached to inside of chimney of residence. (E. G. H.) Autauga Co., 5 miles from Autaugaville, June 20, 1909; nest of small sticks glued 9 ft. up in chimney of old house; five eggs slightly incubated. (L. S. G.)

82. **Archilochus colubris**. RUBY-THROATED HUMMINGBIRD. 'HUMMINGBIRD.' — Moderately common summer resident. Breeding record: Autauga Co., 4 miles from Independence, May 19, 1912, two eggs, almost hatched, in nest of moss and cotton covered with lichens, 11 ft. above ground and 8 ft. out on limb of small post oak in mixed woods. (L. S. G.)

83. **Muscivora forficata**. SCISSOR-TAILED FLYCATCHER.—One taken years ago (about 1889 or 1890) in early spring in Autauga Co., by L. S. Golson.

84. **Tyrannus tyrannus**. KINGBIRD. 'BEE MARTIN.' — Common summer resident. Preferred habitat: Fields, pastures and open woods. Breeding records: Barachias, June 6, 1907; nest of thistle-down, lined with rootlets, about 6 ft. above ground in small hackberry, on bank of slough in open field; three eggs, heavily incubated. An occupied nest of an Orchard Oriole was in the same tree. (E. G. H.) Autauga Co., near Autaugaville, May 26, 1909; compact nest of weed stems, cotton, and wool, lined with fine rootlets, 20 ft. above ground and 16 ft. out on limb of post-oak on open hillside. Three very slightly incubated eggs. (L. S. G.)

85. **Myiarchus crinitus**. CRESTED FLYCATCHER. 'YELLOW KINGBIRD.' — Common summer resident of wooded areas bordering fields. Breeding record: Near Autaugaville, May 26, 1910; nest a large mass of small twigs, straw, etc., lined with feathers and snake skin, in martin box, 50 ft. up on windmill tower in farm yard. Five eggs, slightly incubated. (L. S. G.) Also found nesting in natural cavity in tree in farm yard at Barachias.

86. **Sayornis phœbe**. PHŒBE. 'TICK BIRD.' — Tolerably common winter resident, arriving in October and departing late March or early April. Found in almost any situation.

87. **Myiochanes virens**. WOOD PEWEE. 'TICK BIRD.' — Common summer resident. Preferred habitat, in Autauga Co., pine thickets. Found commonly in deciduous woods in Montgomery Co. Its plaintive note is one of the most characteristic sounds of the long summer days. Breeding record: Autauga Co., near Autaugaville, May 30, 1910; nest of weed-stems and lichens, 20 ft. above ground, saddled 8 ft. out on small limb of small long-leaf pine in pine thicket on dry hillside; three eggs, moderately incubated. (L. S. G.)

88. **Empidonax virescens**. ACADIAN FLYCATCHER.— Common summer resident of swampy woods and banks of streams. Breeding record: Bear Swamp, May 28, 1912; nest loosely built of moss, hair and spider webs, 12 ft. above ground on terminal twigs of large limb of water oak; three fresh eggs. (L. S. G.)

89. **Cyanocitta cristata florincola**. FLORIDA BLUE JAY. 'JAYBIRD.' — Abundant permanent resident, preferring thickets. Breeding

record: Barachias, April 22, 1906; five slightly incubated eggs in nest of twigs, cotton and mud, placed 9 ft. up in pear tree in orchard. (E. G. H.) Near Autaugaville, April 26, 1910; nest of rather large twigs and mud, lined with grass and rootlets; 30 ft. up in large post oak in farm yard; four fresh eggs. (L. S. G.)

90. **Corvus brachyrhynchos paulus**. Howell. SOUTHERN CROW.[1]— Tolerably common permanent resident. Numbers greatly reduced during last 20 years and experience has taught them to be very wary. Breeding record: Bear Swamp, March 23, 1910; nest of large sticks, lined with bark, pine needles, smaller sticks, grass and mud; 52 ft. up in crotch of pine; four fresh eggs. (L. S. G.)

91. **Dolichonyx oryzivorus**. BOBOLINK. 'RICE BIRD.' 'OAT BIRD.' — Observed in Autauga Co., only between dates of about April 20 and June 10. Quite abundant in May in oat fields near Bear Swamp where sometimes hundreds congregate, doing considerable damage to the oats which are at that season in the milk. Occurs quite numerously also in Montgomery Co.

92. **Molothrus ater ater**. COWBIRD.— Seen occasionally during July and August near Bear Swamp feeding most unconcernedly among cows in the pastures. In winter both sexes join the flocks of Red-winged Blackbirds which rove over the country.

93. **Agelaius phœniceus predatorius.**[2] RED-WINGED BLACKBIRD. — Permanent resident, common in favorable localities. More abundant in winter, occurring frequently in flocks of hundreds, occasionally thousands (in Montgomery Co.). Apparently being replaced during winter in Autauga Co., by the Rusty Blackbird, as the latter is becoming more abundant and the Red-wing less so. Mixed flocks of males and females and Cowbirds frequently seen and also often observed associated with grackles. Nesting data: Autaugaville, May 11, 1912; nest of grass and a little trash, 20 in. above water 8 in. deep, in bunch of marsh grass, near a lumber yard; three moderately incubated eggs. (L. S. G.) Subspecies *phœniceus* also, may possibly breed here. A female (W. C. Avery No. 70) in the State University Museum was taken at Greensboro (much to the north of us) on June 2.

94. **Sturnella magna magna**. MEADOWLARK.— Occurs as a winter resident.

95. **Sturnella magna argutula**. SOUTHERN MEADOWLARK. 'FIELD LARK.' — Common permanent resident in Autauga County, much more abundant in Montgomery County, where the great open hay fields are fairly alive with them. Sings through the winter. Breeding records: Barachias, June 2, 1907; five incubated eggs in arched nest of

---

[1] cf. Auk, 1914, p. 115.

[2] cf Mearns, Proc. Biol. Soc. Wash., 1911, p. 227. *A. p. phœniceus* said to = *floridanus* of the A. O. U. Check-List and *phœniceus* of the Check-List becomes *predatorius*.

grasses in depression in open hay field. (E. G. H.) Autauga Co., near Booth, May 15, 1910; nest of fine grass, arched with coarse grass in depression under bunch of grass and two thistles in open pasture; four eggs, heavily incubated. (L. S. G.)

96. **Icterus spurius**. ORCHARD ORIOLE.— Common summer resident of orchards, hedge rows, thickets, etc. Breeding record: Barachias, June 6, 1907; semi-pensile nest of green grasses, lined with thistle down 10 ft. up in small hackberry hanging over slough in open field; five fresh eggs. The green grass of the nest was hardly distinguishable from the leaves of the tree, even at close range. An occupied nest of a Kingbird was in the same tree. (E. G. H.)

97. **Euphagus carolinus**. RUSTY BLACKBIRD.— Abundant winter resident, preferring swamps, moist meadows, etc. Apparently increasing in numbers (Autauga Co.).

98. **Quiscalus quiscula quiscula**. PURPLE GRACKLE. 'CROW BLACKBIRD.' — Permanent resident in favorable localities. Abundant in winter and generally distributed in large flocks. Near Autaugaville all nests found were in old woodpeckers' holes in dead pines standing in water, where some dozen pairs regularly breed. Data: Autaugaville April 28, 1912; nest a large mass of coarse grass, lined with finer grass, in old enlarged woodpecker's hole in dead pine in marsh; four considerably incubated eggs. (L. S. G.)

99. **Quiscalus quiscala æneus**. BRONZED GRACKLE. 'CROW BLACKBIRD.' — Found in company with the Purple Grackle in flocks in the winter.

100. **Carpodacus purpureus purpureus**. PURPLE FINCH.— Observed to frequent hillsides and fields contiguous to Bear Swamp; some even seen in barn yards, between Jan. 2 and Mar. 17, 1912. Observed occasionally during severe winters in past years (Autauga Co.).

101. **Passer domesticus domesticus**. ENGLISH SPARROW. 'TOWN BIRD.' — Very abundant about towns and also in the country about houses, stables, etc. Permanent resident.

102. **Loxia curvirostra minor**. CROSSBILL.— Flock of 25 or 30 seen feeding in a red juniper tree in a farm yard near Bear Swamp about 1883; several taken. No record since.

103. **Astragalinus tristis tristis**. GOLDFINCH. 'WILD CANARY.' "LETTUCE BIRD." — Common permanent resident. Summer habitat: Moist pastures and old fields and woods bordering streams and ponds. Generally distributed in winter (Autauga Co.). Not so well known in Montgomery Co.

104. **Pocecetes gramineus gramineus**. VESPER SPARROW. 'GRASS SPARROW.' — Very common winter resident of grassy fields, associated generally with the Savannah Sparrow.

105. **Passerculus sandwichensis savanna**. SAVANNAH SPARROW. 'GRASS SPARROW.' — Abundant winter resident of grassy fields, associated generally with Vesper Sparrows.

106. **Ammodramus savannarum australis**. GRASSHOPPER SPARROW.— Taken occasionally at Barachias, Montgomery Co. Habits not well known. Apparently frequents sedge fields.

107. **Zonotrichia albicollis**. WHITE-THROATED SPARROW. 'YELLOW-HEADED SPARROW.' — Abundant winter resident of briers, thickets and fence rows.

108. **Spizella passerina passerina**. CHIPPING SPARROW.— Tolerably common permanent resident. Habitat: Dry woods, fields, etc. Breeding record: Bear Swamp, May 17, 1910: three fresh eggs; nest of weed stems and grass, lined with hair and moss, 16 ft. up in post oak and 10 ft. out on branch; tree on edge of swamp. (L. S. G.)

109. **Spizella pusilla pusilla**. FIELD SPARROW. 'GRASS SPARROW.' — Common permanent resident of fields and open country in general. Breeding records: 3½ miles S. E. of Montgomery, April 30, 1905; three eggs in nest of fine grass on ground in hay field; incubation advanced. (E. G. H.) Bear Swamp, May 7, 1910; nest of grass, loosely built, lined with finer grass, 2 ft. up in small cluster of sweet gum bushes in edge of swamp; four slightly incubated eggs. Within 6 ft. of Towhee's nest on ground. (L. S. G.)

110. **Junco hyemalis hyemalis**. SLATE-COLORED JUNCO. 'SNOWBIRD.' 'WHITE-TAILED SPARROW.' — Common winter resident. Found in small flocks, sometimes associating with Field, Chipping and White-throated Sparrows, generally about bushy places.

111. **Peucæa æstivalis bachmani**. BACHMAN'S SPARROW.— Rather uncommon permanent resident; more in evidence in spring and summer. Known to breed, but no sets taken by us.

112. **Melospiza melodia melodia**. SONG SPARROW.— Common winter resident of weedy pastures and old fields, invariably near water. Generally associated with Swamp Sparrows.

113. **Melospiza georgiana.** SWAMP SPARROW.— Abundant winter resident of damp situations generally, but has also been taken on dry hillsides. Prefers wet, weedy bottoms.

114. **Passerella iliaca iliaca**. FOX SPARROW.— Uncommon winter resident.

115. **Pipilo erythrophthalmus erythrophthalmus**. TOWHEE.— 'JOREE.' — Common winter resident. It is difficult to determine whether most of our winter Towhees are subspecies *erythrophthalmus* or *canaster*, but as three out of four birds taken in December and January proved to be *canaster* we are inclined to believe that this form predominates. If this is true, then *canaster* certainly migrates, because Towhees are vastly more numerous with us in winter than in summer.

116. **Pipilo erythrophthalmus canaster** Howell. ALABAMA TOWHEE.[1] 'JOREE.' — Uncommon permanent resident; abundant in winter,

[1] cf. Auk, 1914, p. 115.

when thickets and brief patches are fairly alive with them, associated with White-throated Sparrows. Breeding records: Bear Swamp, Autauga Co. June 23, 1909; nest of grass and pine needles, enveloped in oak and beech leaves, 7½ ft. from ground in vine-covered bush; three eggs, one pipped and other two rotten. (L. S. G.) Another nest discovered May 7, 1910, on ground under muscadine vine in Bear Swamp, contained four fresh eggs. (L. S. G.)

117. **Cardinalis cardinalis cardinalis**. CARDINAL. 'REDBIRD.' — Very common permanent resident; breeding from April 10 to August 20. An inhabitant of thickets and brier-patches throughout the woods and swamps. Breeding records: Barachias, April 10, 1908; nest of grasses and leaves in plum tree, about 3 ft. above ground in open field; three fresh eggs. (E. G. H.) Autauga Co., near Autaugaville, April 18, 1909; nest of leaves, pieces of bark and little sticks on vine-covered mock orange limb over thickety ditch; three fresh eggs. (L. S. G.)

118. **Zamelodia ludoviciana**. ROSE-BREASTED GROSBEAK.— Male taken at Barachias, April 26, 1909; female seen May 2, 1913.

119. **Guiraca cærulea cærulea**. BLUE GROSBEAK.— Common summer resident of old fields, thickets and hedge rows. Data: Four miles S. E. of Montgomery, July 3, 1908; nest of leaves, paper, weeds and grass, lined with grass and horse hair, placed in crotch about 5 ft. up in osage orange hedge on roadside; four nearly hatched eggs. (E. G. H.) Autauga Co., near Autaugaville, June 6, 1909; nest of leaves, weed stems and wool, lined with rootlets and a little hair, 2 ft. up in blackberry briers on open hillside; three eggs considerably incubated. (L. S. G.)

120. **Passerina cyanea**. INDIGO BUNTING. 'SWAMP BLUEBIRD.'— Common summer resident of old fields and ditch banks, preferring damp situations. Data: Barachias, June 4, 1908; nest of grass and leaves, lined with fine grass, suspended 3 ft. from ground in crotch of hackberry bush on ditch bank in open hay-field; three eggs, incubation just begun. (E. G. H.) Autauga Co., near Autaugaville, May 22, 1910; compact nest of cane leaves and weed stems, lined with fine grass and wool, firmly fastened 4 ft. up in clump of sweet gum bushes on edge of swamp and cultivated field; three fresh eggs. (L. S. G.)

121. **Spiza americana**. DICKCISSEL.— Rather common summer resident of the hay fields of Montgomery Co.; rare in Autauga Co. Data: Barachias, June 20, 1909; nest of weed stems, lined with grasses, 2 ft. up in small bush in hay field; four eggs, very slightly incubated. (E. G. H.) Autauga Co., near Autaugaville, May 14, 1911; nest of weed stems, grass and cotton, 2 ft. up in oak bush growing out of drain ditch in large open field; four slightly incubated eggs. (L. S. G.)

122. **Piranga erythromelas**. SCARLET TANAGER.— Known only as a spring migrant. Not common.

123. **Piranga rubra rubra**. SUMMER TANAGER. 'BEE BIRD.' 'SUMMER REDBIRD.' — Abundant summer resident, generally distributed. Data: Autauga Co., near Autaugaville, May 19, 1912; four considerably

incubated eggs in nest of weed stems and grass, lined with clean, white straw; nest 5 ft. from ground, 6 ft. out on limb of post oak on wooded hillside. (L. S. G.)

124. **Progne subis subis.** PURPLE MARTIN. 'GOURD MARTIN.' "MARTIN." — Common summer resident, distribution depending upon preparations made for it. Not known to breed except in gourds or bird boxes erected near farm houses. Data: Autaugaville, May 28, 1911; nest a few sticks and oak leaves in bird box at negro's house on edge of swamp. Five heavily incubated eggs. (L. S. G.)

125. **Hirundo erythrogastra.** BARN SWALLOW.— Occurs regularly in migrations. Has been reported as late as May 6.

126. **Iridoprocne bicolor.** TREE SWALLOW.— We are unable to find a record of this swallow in our note-books, though it undoubtedly occurs. "A. M. R." in Forest and Stream (Vol. XX, No. 17, p. 323) says it was "occasionally seen on the Alabama River" at Montgomery.

127. **Riparia riparia.** BANK SWALLOW. 'SAND MARTIN.' — Found breeding in bluffs of Alabama River at Washington Ferry, May 5, 1895; two fresh eggs in cavity at end of 18 in. burrow; set incomplete. Bird taken from nest. (L. S. G.)

128. **Stelgidopteryx serripennis.** ROUGH-WINGED SWALLOW. 'SAND MARTIN.' — Occurs in some numbers during spring and summer. No authentic nesting record, but most probably the species breeds here. (Autauga Co.).

129. **Bombycilla cedrorum.** CEDAR WAXWING. 'CEDARBIRD.' 'SEAL.' — Rather common winter resident, tarrying until June. Irregular however

130. **Lanius ludovicianus ludovicianus.** LOGGERHEAD SHRIKE. 'BUTCHER BIRD.' 'FRENCH MOCKINGBIRD.' 'CATBIRD.' — Common permanent resident, apparently most numerous in winter. They do a great deal of good by destroying large numbers of grasshoppers, large beetles and even mice. On the prairies of Montgomery Co., especially, they are indefatigable in the destruction of grasshoppers. Data: Barachias, May 26, 1908; nest of weed stems, lined with wool, thistle down, leaves, grass, and rootlets, 3½ inches wide by 2 inches deep, placed 15 ft. up on horizontal branch of hackberry; five fresh eggs. (E. G. H.) Autauga Co., near Autaugaville, April 2, 1910; large, well-built nest of briers and plum twigs, lined with grass, hair and feathers, 5½ ft. up in crotch of haw bush on ditch bank in old field; five heavily incubated eggs. (L. S. G.)

131. **Vireosylva olivacea.** RED-EYED VIREO. 'HANGING BIRD.' — Common summer resident of groves and the more open woods. Data: Autauga Co. near Autaugaville, May 26, 1910; nest of bark, plant fiber, etc. lined with grass, suspended between fork of sweet gum 8 ft. over dry ditch through old field; three nearly fresh eggs. (L. S. G.).

132. **Lanivireo flavifrons.** YELLOW-THROATED VIREO.— Rather common summer resident, frequenting thicker woods and taller trees than the Red-eyed. One nest discovered with four almost grown young on

May 15, 1910. Typical vireo nest, swinging from branchlets of sweet gum tree on edge of Bear Swamp, Autauga Co. (L. S. G.)

133. **Lanivireo solitarius** subsp. BLUE-HEADED VIREO.— One seen in edge of Bear Swamp on November 25, 1912.

134. **Vireo griseus griseus.** WHITE-EYED VIREO. 'HANGING BIRD.' — Common summer resident of swamps and damp thickets. Especially numerous in Bear and Catoma Swamps where his energetic "Ship-it-to-the-railroad, Ship!" can be heard at any hour of the day during the hot summer months. Data: Barachias, May 17, 1909; four young in typical vireo nest suspended from fork of blackberry brier in patch in damp woods. (E. G. H.) Autaugaville, May 1, 1910; nest a beautiful cup-shaped structure of corn shucks, weed stems, and lichens, lined with fine grass, suspended in small fork of alder limb in bush-grown marsh; four heavily incubated eggs. (L. S. G.)

135. **Mniotilta varia**. BLACK AND WHITE WARBLER.— Rather common summer resident, more abundant in spring. Only nest recorded discovered April 25, 1891, near Autaugaville; four eggs, very slightly incubated, in well made nest in hollow under roots of small bush leaning out over wooded hillside. (L. S. G.)

136. **Protonotaria citrea**. PROTHONOTARY WARBLER. 'SWAMP YELLOWBIRD.' — Common summer resident of swamps. Data: Autaugaville, June 16, 1912; five well-incubated eggs in cavity of small, live beech over creek. Cavity filled to depth of one foot or more with moss and trash and a nice little nest cupped into it about 2½ in. below entrance; lined with black rootlets and fine weed stems. (L. S. G.)

137. **Helinaia swainsoni**. SWAINSON'S WARBLER.— Rare summer resident of Bear Swamp. A pair observed April 15, 1912. (L. S. G.)

138. **Helmitheros vermivorus**. WORM-EATING WARBLER.— Taken at Barachias, May 1, 1913.

139. **Vermivora bachmani**. BACHMAN'S WARBLER. — One seen April 16 and another Aug. 26, 1912, Autaugaville. (L. S. G.)

140. **Vermivora pinus**. BLUE-WINGED WARBLER.— One pair observed throughout the early summer of 1912 and as late as July, in creek swamp at Autaugaville.

141. **Compsothlypis americana americana**. PARULA WARBLER.— Tolerably common summer resident of swamps and low woods, more abundant in spring. Eggs once taken at Barachias, but no data available.

142. **Dendroica æstiva æstiva**. YELLOW WARBLER.— Very uncommon about Bear Swamp; recorded also from Barachias. One nest taken about June 20, 1903, near Autaugaville, but unfortunately the record has been lost; female was taken and male seen.

143. **Dendroica coronata**. MYRTLE WARBLER.— Common winter resident.

144. **Dendroica magnolia**. MAGNOLIA WARBLER.— Observed during spring migrations near Prattville, Autauga Co.

145. **Dendroica cerulea**. CERULEAN WARBLER.— One pair seen in trees on river bank, Autauga Co., May 11, 1913, apparently nesting.

146. **Dendroica pensylvanica**. CHESTNUT-SIDED WARBLER.— Fine male taken at Barachias, April 29, 1913, and another seen next day in Catoma Swamp.

147. **Dendroica striata.** BLACK-POLL WARBLER.— Male taken at Barachias, April 22, 1913, in open woods.

148. **Dendroica fusca**. BLACKBURNIAN WARBLER.— Common during spring migrations in Autauga Co. One seen as late as May 12, 1912.

149. **Dendroica dominica dominica**. YELLOW-THROATED WARBLER.— Rather common spring and summer resident. Prefers large growth woods, both hills and lowlands (Autauga Co.).

150. **Dendroica virens**. BLACK-THROATED GREEN WARBLER. Male seen near Prattville, April 27, 1913, and specimen taken at Barachias, April 30.

151. **Dendroica vigorsi**. PINE WARBLER. 'YELLOW PINE BIRD.'— Rather common permanent resident. It is one of the few birds that sings throughout the long, hot summer days, and even the chill of mid-winter is not enough to dampen its ardor. Data: Barachias, April 30, 1909; small compact nest of grasses and very small weed-stems, lined with hair, thistle down and several feathers; saddled on extreme end of limb of small pine, 20 ft. above ground in mixed woods; four moderately incubated eggs. (E. G. H.) Bear Swamp, April 3, 1911; nest 35 ft. up in pine on edge of swamp; four fresh eggs; nest completed a week or more before first egg was laid. (L. S. G.)

152. **Dendroica palmarum palmarum**. PALM WARBLER.— Occurs in considerable numbers during spring migrations, tarrying several weeks. Subspecies *hypochrysea* very probably occurs.

153. **Dendroica discolor**. PRAIRIE WARBLER.— Common summer resident, arriving generally in March. Prefers dry hillsides covered with shrubby growth. Data: Near Autaugaville, June 18, 1909; nest of soft plant fiber, lined with fine grasses, 4 ft. up on leaning post oak sapling on scrubby hillside; three nearly fresh eggs. Another nest discovered May 12, 1912, contained three eggs. (L. S. G.)

154. **Seiurus aurocapillus**. OVEN-BIRD.— One taken at Barachias, May 1, 1913, in heavy undergrowth.

155. **Seiurus noveboracensis** subsp. WATER-THRUSH.— Taken at Barachias, April 22 and 30, 1913. Both subspecies *noveboracensis* and *notabilis* may occur.

156. **Seiurus motacilla**. LOUISIANA WATER-THRUSH.— Uncommon spring and summer resident of swamps (Autauga County).

157. **Oporornis formosus**. KENTUCKY WARBLER. — A few pairs breed every year in the vicinity of Bear Swamp; also found breeding in Catoma Swamp. Data: Catoma Swamp, near Barachias, April 22, 1906; four fresh eggs in nest on ground at foot of a cane, within about 2 ft. of an old swamp road; nest a small, compact structure of black rootlets inclosed in a loose mass of cane leaves. (E. G. H.)

158. **Geothlypis trichas ignota**. FLORIDA YELLOW-THROAT.— Com-

mon permanent resident, more abundant in spring and summer. Nesting data: Bear Swamp, May 15, 1910; nest of fine grass upon cane leaves in bunch of broom sedge, 3 in. above ground, in sedge field adjoining swamp; four eggs, slightly incubated. (L. S. G.) Subspecies *trichas* probably occurs during migrations.

159. **Icteria virens virens**. YELLOW-BREASTED CHAT.— Common spring and summer resident of thickets about the fields. In Autauga Co., always near water. Data: Near Montgomery, June 3, 1907; nest of grasses, 3 ft. up in osage orange bush on roadside; four eggs, well incubated. (E. G. H.) Near Autaugaville, May 12, 1912; four fresh eggs in nest of grasses, etc., 18 in. above ground in open woods. (L. S. G.)

160. **Wilsonia citrina**. HOODED WARBLER.— Common spring and summer resident of swamps and damp woods. Data: Bear Swamp, Autauga Co., May 28, 1909; nest of weed stems, pine needles and cane leaves, lined with fine plant fibers, 2½ ft. up in shrub, in thick, boggy swamp; three eggs, slightly incubated. (L. S. G.)

161. **Setophaga ruticilla**. REDSTART.— Occurs commonly in both counties during migrations and probably breeds. It was observed in Bear Swamp almost constantly from April 1 until July 10, 1913.

162. **Anthus rubescens**. PIPIT. 'PRAIRIE SPARROW.' — Common winter resident. Prefers the old fields in Autauga Co., commonly following the plow in winter and spring. A typical winter bird of the open prairies of Montgomery Co., where it is abundant, generally occurring in loose flocks of 25 to 150.

163. **Mimus polyglottos polyglottos**. MOCKINGBIRD. — Common premanent resident, preferring the vicinity of habitations. Extreme nesting dates, April 16, and June 27. Data: May 5, 1907, near Prattville; four fresh eggs; nest of twigs, lined with fine rootlets, placed in tangle of *Smilax* briers in haw bush about 6 ft. above ground. Bush in open pasture hardly 20 yds. from stables. (E. G. H.)

164. **Dumetella carolinensis**. CATBIRD.— Irregular summer resident of both counties, generally more or less common. Has been observed in Montgomery Co., on March 24, 1912, and January 6, 1913. Stragglers may spend the winter. Data: June 1, 1905, Carter Hill Road, 3½ miles out of Montgomery; nest of twigs and leaves, about 7½ ft. up in osage orange hedge on roadside; three eggs, incubation advanced. (E. G. H.) May 21, 1911, near Prattville; nest of grass and small twigs, 6 ft. up in alder bush in wet pasture; four fresh eggs. (L. S. G.)

165. **Toxostoma rufum.** BROWN THRASHER. 'THRASHER.' — Commonly spoken of as "Brown Thrush," when an attempt is made by the average person to be particularly correct. Very common permanent resident of briers, thickets, hedge rows, swamps, etc. Data: April 14, 1907, near Prattville; nest of twigs about 8 ft. up in bush growing in midst of brier patch on edge of cultivated field; four eggs. (E. G. H.) April 28, 1909, Barachias; three young, pin-feathers just started, in nest of twigs, about 9 ft. up in crotch of haw tree. (E. G. H.)

166. **Thryothorus ludovicianus ludovicianus**. CAROLINA WREN. 'WREN.' — Common permanent resident, preferring no particular habitat, though perhaps found oftener in swamps in winter. Persistent singer. Data: April 8, 1911, Bear Swamp; nest about 2 in. above ground, in small clump of bushes, vines, etc., made of black rootlets and lined with hair and snake skin; five slightly incubated eggs. (L. S. G.)

167. **Thryomanes bewicki bewicki**. BEWICK'S WREN. 'WREN.' — Common winter resident, exhibiting a fondness for brush heaps, and piles of fuel wood about yards. It is much more confiding than the Carolina Wren and it is not at all unusual for it to hop on the window-sill or doorstep.

168. **Nannus hiemalis hiemalis**. WINTER WREN.— An uncommon winter resident of swamps, inhabiting brush heaps, logs, fallen tree tops, etc.

169. **Cistothorus stellaris**. SHORT-BILLED MARSH WREN.— Apparently very uncommon, though on account of its retiring habits it may be more numerous than supposed. Specimen taken at Barachias, Jan. 9, 1913.

170. **Telmatodytes palustris iliacus**. LONG-BILLED MARSH WREN. — Male taken Oct. 26, 1913, in old field near Autaugaville.

171. **Certhia familiaris americana**. BROWN CREEPER.— Uncommon winter resident.

172. **Sitta carolinensis atkinsi**. FLORIDA WHITE-BREASTED NUTHATCH.— Rather common permanent resident, much in evidence in early spring. More numerous in Autauga than in Montgomery Co. Data: Autauga Co., vicinity of Bear Swamp, March 17, 1911; nest of hair, feathers and fine bark in hole in short, dead limb of large live pine tree on wooded hillside. Hole about 60 ft. above ground and a foot deep. Five eggs, very slightly incubated. (L. S. G.)

173. **Sitta pusilla**. BROWN-HEADED NUTHATCH. 'CHĀ-CHĀ.' — Common permanent resident, more in evidence in spring. Especially numerous among old pine snags standing in the fields of Autauga Co. Not so common in Montgomery Co. Data: near Prattville, April 15, 1906; nest of wool, cotton and pine mast in hole 3½ ft. from ground, in pine snag standing in cultivated field; six eggs, slightly incubated. (E. G. H.)

174. **Bæolophus bicolor**. TUFTED TITMOUSE. 'TOM-TIT.' — Common permanent resident, preferring dry situations and not averse to the vicinity of human habitations. Seems to have a fondness for oaks. Data: Near Autaugaville, July 9, 1909; nest of rotten wood, hair, etc., in large, natural cavity in half dead scrub oak on wooded hillside; opening of cavity about 4 ft. above ground and nest one foot below opening; four slightly incubated eggs. (L. S. G.) Near Autaugaville, May 15, 1910; nest of cotton and very fine grass in natural cavity 7 inches deep, 12 ft. from ground in post oak in open woods; five fresh eggs. (L. S. G.)

175. **Penthestes carolinensis carolinensis**. CAROLINA CHICKADEE. — Common permanent resident, generally distributed throughout woods and swamps. Data: Barachias, March 29, 1908; nest of lichens, lined

with wool and fine grass fibers, in hole 6 in. deep in rotten stump about 2 ft. high; nest entrance 18 in. above ground; low woods; five eggs, incubation just begun. (E. G. H.) Near Autaugaville, April 16, 1909; five fresh eggs; nest in hole in rotten oak stump, 5 ft. above ground on wooded hillside. (L. S. G.)

176. **Regulus satrapa satrapa**. GOLDEN-CROWNED KINGLET.— Rather common winter resident. Generally found associated with the Ruby-crowned and often with Chickadees.

177. **Regulus calendula calendula**. RUBY-CROWNED KINGLET.— Rather common winter resident, more numerous than the Golden-crowned.

178. **Polioptila cærulea cærulea**. BLUE-GRAY GNATCATCHER.— Common summer resident. In Autauga Co., preferring scrub oaks. Data: Autauga Co., near Booth, April 17, 1910; nest of moss, lichens, cotton, etc., (much like a hummingbird's), 4 ft. out on branch of oak, about 22 ft. above ground, on wooded hillside; three slightly incubated eggs. (L. S. G.)

179. **Hylocichla mustelina**. WOOD THRUSH. 'SWAMP SPARROW.' — Very common summer resident, inhabiting alike moist and dry situations. Data: Booth, April 27, 1908; nest of moss and leaves, lined with grasses, 8 ft. up in fork of haw bush on roadside in woods; three fresh eggs. Nest contained no mud. (E. G. H.) Barachias, May 12, 1909; four incubated eggs in nest of leaves and mud, lined with rootlets, 6½ ft. up in haw bush in woods. (E. G. H.)

180. **Hylocichla ustulata swainsoni**. OLIVE-BACKED THRUSH.— Two taken April 30, 1913, in low woods-pasture at Barachias. Two more taken in same place May 2.

181. **Hylocichla guttata pallasi**. HERMIT THRUSH. 'SWAMP SPARROW.' — Rather common winter resident, found in summer haunts of the Wood Thrush.

182. **Planesticus migratorius migratorius**. ROBIN.— Abundant winter resident.

183. **Planesticus migratorius achrusterus**. SOUTHERN ROBIN.— Rare breeder. Two pairs nested in 1890 in yard of Mr. John L. Cobbs in Montgomery. (W. C. Avery, Am. Field, XXXV, 1891, page 55.)

184. **Sialia sialis sialis**. BLUEBIRD.— Common permanent resident. Almost exterminated by severe winter of 1894–1895, but gradually increasing generally. Considerably smaller numbers of breeding birds observed during spring and summer of 1912, in Autauga Co., than in past few years. Data: Autauga Co., near Prattville, April 15, 1906; nest mere bunch of dried grass and feathers in hole 6½ ft. up in pine stump in open pasture; five fresh eggs. (E. G. H.) Vicinity of Bear Swamp, Autauga Co., May 31, 1909; four nearly fresh eggs in well made nest of grass in hole 10 ft. up in dead elm in cornfield on edge of swamp. (L. S. G.)

ACADIAN CHICKADEES (*PENTHESTES HUDSONICUS LITTORALIS*) IN BOSTON AND VICINITY IN THE FALL OF 1913.

BY HORACE W. WRIGHT.

AN unprecedented incursion of Acadian Chickadees into the territory about Boston and in Eastern Massachusetts began to be observed on October 29, and their presence has been recorded in various localities throughout the month of November and to the period of midwinter, 1914. On the date above named three individuals were seen in South Sudbury not far from the Wayside Inn at a roadside bordered with a considerable extent of white pine growth. Their characteristic tones in calling at once made identification easy. This occurrence in itself was unusual, for I knew of no previous record of even three birds of this species having been seen together in Eastern Massachusetts. In November, 1904, I had seen four birds in as many different localities between the 4th and 25th days (Auk, XXII, Jan., 1905, p. 87). The records of other observers, which are within my knowledge by publication, are of a single individual, or in one instance two birds, and of but one bird, rarely two, in a season, in years rather widely separated.

It was with increased interest, therefore, that two days later, October 31, I met two more Acadian Chickadees, one in the Lawrence woods at West Medford in growth of red cedar, and the second near the western shore of Spot Pond in Middlesex Fells, Stoneham, in white pine and oak growth. On the following day, November 1, three more birds were found in cedar-grown pastures in Belmont, two being seen together moving from one red cedar to another in company with Black-capped Chickadees, and the third bird a quarter of a mile farther on in similar growth. Upon visiting the Public Garden on the next day, November 2, within a few minutes of my entrance, the voice of *hudsonicus* was heard, and the bird was presently seen in an English hawthorn, calling sufficiently often to reveal its movement from this tree to others, all deciduous, for there are no permanent evergreens within the Garden. Two Brown Creepers were this bird's nearest companions.

Two hours later the voice of *hudsonicus* was heard at Charlesgate, proceeding from a bird closely pursued by a House Sparrow along the embankment bordering the Charles River Basin. On a visit to the Melrose section of the Fells on the following day, November 3, three more birds were seen, two feeding upon stalks of golden rod at the border of woodland, and the third a mile distant in the Medford section in young white pines.

Up to this time thirteen individuals had been seen in a period of six days in nine different localities. On November 6 in a walk through Wayland into the border of East Sudbury the voice, now come to be not infrequently heard, revealed a bird once again in red cedar growth, among Golden-crowned Kinglets and Black-capped Chickadees, with Fox Sparrows scratching on the ground and a Winter Wren occasionally scolding and appearing among the stones of the pasture wall. A week later, November 13, four birds were seen in the Belmont pastures feeding together on stalks of golden rod, patches of which stood among the not thickly growing red cedars. The four were observed at one and the same view several times as they successively moved from one patch to another. When occasionally they flew into the cedars, it was but to return presently to the golden rod. They called scarcely at all, but fed silently. No Black-capped Chickadees were in the immediate vicinity, but Goldcrests flitted among the cedars. On November 18 a bird, apparently alone, was seen at the extreme northern end of the Fells in the Winchester section in cedar and pitch pine growth; and a mile distant on Bear Hill the voice of another was heard among the cedars.

On November 22 I again very leisurely traversed the cedar-juniper-grown pastures of Belmont, which constitute an area of half a square mile or more, with the definite intent of scoring as far as possible the exact representation of *hudsonicus* within its range. The result was nine birds, namely, 2+2+1+2+1+1. These were all moving from one cedar to another, or feeding upon stalks of weeds, or picking seeds on the ground. In the locality where the four birds had been feeding together on the 13th, no *hudsonicus* was noted, but among the Golden-crowned Kinglets was an Orange-crowned Warbler well revealed on a barberry bush, and among the rocks in the glen was a Winter Wren. In a trip to

North Scituate on November 25 with Mr. Richard M. Marble three birds were seen in an extensive growth of red cedar about a mile inland from the beach. These were actively moving with Black-capped Chickadees. Across the highway in thick growth of horse-briar a Carolina Wren had just been seen, and below the cedars in a swampy deciduous wood we disturbed a Black-crowned Night Heron roost, sixteen birds taking flight. On November 26 the call was heard in the Arnold Arboretum in its northern section.

These several records indicate that at least twenty-five different individuals were noted within the period of October 29 to November 26 inclusive, and, perhaps, five others should be added as not having been already enumerated. In most instances the calls were but little heard. The birds have been much less inclined to voice themselves than is the Black-capped Chickadee. No song note has been heard on any occasion. Cedar growth proves to be especially attractive to them. One bird, watched for a time at North Scituate, was seen to be picking at the green undeveloped berries of a red cedar. They have mostly been found in trees of low growth, whether pine or red cedar, and usually at a range below the eye, not infrequently on stalks of golden rod, and sometimes on the ground.

To my own records I am able to add the records of other observers who have coöperated to adequately emphasize the extent of this Acadian incursion into this vicinity. They are:

Three birds seen by Mr. William Brewster on his place at Concord, October 27, and observed at intervals up to November 4.

Eight or ten birds seen or heard by Mr. James L. Peters at Harvard and vicinity. The first bird noted was in his father's orchard in company with Blackcaps on October 27, 28, and 29, appearing successively at almost the same hour in the afternoon on the three consecutive days. On November 2, Mr. Peters states, he was awakened by the notes of an Acadian Chickadee under his window, perhaps the same bird. On November 4 and 7 two birds were seen in the orchard regarded as newly arrived. In each of five other localities, within or near the town of Harvard, Mr. Peters saw a single bird on dates between October 30 and November 11. One of these was collected by him, and was identified by Mr. Outram Bangs as *P. h. littoralis*.

One bird seen by Miss Anna K. Barry on a farm in Gleasondale,

October 30, "near the edge of a pasture, feeding on the seeds of golden rod, in company with two Black-capped Chickadees."

Three birds, or more, seen by Mr. Outram Bangs in Wenham-Hamilton on October 30 or 31.

One bird seen by Mr. and Mrs. C. A. Robbins of Onset at Sagamore Beach on November 2.

Two birds seen by Mr. Richard M. Marble in Harvard Forest, Petersham, November 4, and on the 15th day "one more."

Six birds seen by Dr. Walter Faxon and Dr. Winsor M. Tyler on the Belmont lands, November 6; five again seen on the 8th. Dr. Tyler writes, "The five and six birds kept together in a loose flock, and we thought they were associated with Kinglets rather than with *P. atricapillus*. We watched the chickadees from within three feet and once a bird perched six inches from Mr. Faxon at the height of his knee." It is very probable that in my own accounting most of these individuals have been enumerated. On November 20 Dr. Tyler collected one from a flock of four, again seen in Belmont, for the Harvard University Museum. He states, "This bird was identified by Mr. Bangs as an extremely small specimen of *P. hudsonicus littoralis*," thus deciding the question whether our rare visitants were *P. h. hudsonicus* or *P. h. littoralis*.

Four birds seen together by Mr. G. B. Wellman on Bear Hill in the Middlesex Fells, Stoneham, on November 8. Mr. Wellman writes, "After about one hour spent looking around I at length heard the voice of *hudsonicus* on the north side of the hill.... and came upon four birds, all of them in most beautiful plumage and as tame as they always are in the mountains. All four were at times but three feet from my hand. Their sides, it seemed to me, were of a deeper rufous color than in the summer." At a distance from these Mr. Wellman heard the call of a fifth bird.

Five birds seen by Dr. Glover M. Allen with Mrs. Allen in the Arnold Arboretum on November 22. Dr. Allen states, "The flock of five was with one Golden-crowned Kinglet among the spruces at sunset, calling and twittering softly a good deal. Two went to drink at the little brook, hopping down from a birch to the water. They kept to the inside of thick spruces rather low down, but one or two moved out to the ends of the boughs to show themselves." Dr. Allen had seen one bird in the Arboretum on

November 15, "following," he states, "a flock of four or five Black-capped Chickadees and half a dozen Golden-crowned Kinglets. It was the last to leave Hemlock Hill, crossing the road to the north, and quickly flitted into a low evergreen silently, then for an instant into a large white oak, and then quickly darted into another low evergreen, whence I once heard his characteristic note."

One bird seen by Miss Annie W. Cobb in Arlington on November 22. Miss Cobb states that the bird was in a pine grove off Forest St., was first heard in the tall pines and later was seen feeding in low bushes at the edge of the grove, and that Black-capped Chickadees and Kinglets were its companions.

Two birds seen by Dr. Walter Faxon on Granny Hill in Lexington, November 24; one seen by Dr. Faxon and Dr. Tyler on the following day; and two birds again seen by both observers on the 26th. Dr. Tyler states that these three records represent probably only two birds. He further writes, "We have found the Acadian Chickadees, as you have, associated with *P. atricapillus* and *Regulus satrapa*, frequenting cedar pastures and pine woods; oftenest, perhaps, feeding in barberry bushes, golden rod, and small gray birch growth; often too on the ground."

One bird seen by Mr. F. S. Dane in Lexington in a distant part of the town from the locality of the other records on November 29.

A bird, on the testimony of Dr. John B. May, brought in to his sister, a teacher at Gloucester, in a disabled condition, which after a time revived and was able to fly away, on a day about the last of November.

Two birds seen by Dr. G. M. Allen by Jamaica Pond on November 30, moving through the elms; no companions with them. Probably these same two birds were seen by me on December 9 in planted hemlocks near the pond, and one of them by Mr. H. L. Barrett on January 7 in the same growth.

On December 10 eight of the company of Belmont birds were again found by me in a careful search through the juniper-red cedar-grown pastures. They were either feeding on juniper or on the ground about it, there being no snow on the surface.

Four birds seen by Mrs. Edmund Bridge in Cohasset, December 9, among growth of cedar and feeding on golden rod stalks.

Three birds seen by Mrs. Bridge and companions on Castle Hill,

Ipswich, December 27, feeding in the conifers, and again observed on January 10. The same three birds, undoubtedly, were seen by Dr. Charles W. Townsend and Mr. Francis H. Allen, on January 11, gleaning on the larch trees on Castle Hill.

In early February these Acadian Chickadees in the vicinity of Boston were no longer in evidence. None could be found in the Arboretum, Olmsted Park, Belmont, Harvard, Lexington, or other places as far as heard from. The latest record furnished me was of the Arboretum birds, seen by Dr. G. M. Allen on January 23 among the same conifers in which they had previously been observed. Some were picking on the ground under the thick spruces, others were in the trees, Dr. Allen states. They were very quiet, giving only the slight single call-note, not characteristic. Five or six inches of snow lay upon the surface, but the ground was bare under the spruces. On the tenth of February a careful search by Mr. Barrett and myself failed in finding them. On February 2 I had searched the Belmont pastures also without finding any. Mr. Peters at Harvard saw none after the middle of November, Dr. Faxon and Dr. Tyler at Lexington none after the first of December. They seem to have disappeared with the Golden-crowned Kinglets, with whom they were the closest companions. These usually pass mostly out of evidence by early January in the vicinity of Boston.

Whether the Eastern Massachusetts birds moved farther south or had begun a return migration northward is an interesting point remaining undetermined. 'Bird-Lore' of February, 1914, page 52, furnishes evidence that the migration in November extended as far southward as Hartford, Connecticut, two birds having appeared at the feeding-tray of Miss K. C. Robbins in Wethersfield on or about November 13 and continuing for some time to make almost daily visits to her hospitable board. Two other birds were seen at West Hartford by Mr. George F. Griswold on November 27. Mr. Arthur G. Powers in his Hartford bird-census of December 25 states that he was unable to find a pair of Acadian Chickadees on that day, although they had been seen only a few days before and had been seen frequently for a month previous. These Connecticut records with a single exception are the first for the state, as shown by the official publication, 'The Birds of Connecticut'

by John Hall Sage and Louis Bennett Bishop, M. D., the previous occurrence having been that of a single bird collected by Mr. Robert Morris, while shooting in a wooded ravine a few miles from New Haven on November 13, 1875. Warwick, R. I., reported one bird seen on December 25, "the second record for Rhode Island," on the statement of Mr. H. S. Hathaway; and Rhinebeck, N. Y., reported two birds in the 'Bird-Lore' Christmas census.

In September, 1913, the southward movement of Acadian Chickadees was observed at Jefferson, N. H., where on the mountains the species breeds, but is only occasionally noted on the hillsides and in the valleys. Beginning with the fifth day one, two, or three birds were observed almost daily in various localities throughout the month and into early October, some in our immediate neighborhood on the Highland and three on our place, September 29 and 30. Their presence indicated an unusual movement, for in no previous season had the species been as much in evidence among the southward moving migrants.

The records furnished me present an aggregate of over forty individuals which have been noted by the several observers in fifteen different towns or distinct localities. These records with my own aggregate seventy or more individuals; thirty-five of these have been seen in Boston and its immediate vicinity. The number recorded, it would seem probable, must be but a fraction of those which entered the eastern part of the state, so few localities have been reported, while others which afford equal attractions to the species have not been heard from and probably have lacked observers. The incursion, therefore, so far as all previous records show, has been unprecedented, beginning in late October, attaining its maximum in early November, continuing into December and January, and apparently ending before February.

One suggestion has been offered tentatively as an explanation of this remarkable flight, namely, that an insect pest, the spruce-bud worm, a tortricid moth (*Tortrix fumiferana*), having destroyed the season's new growth over extensive areas of spruce and pine forest in New Brunswick and Maine last summer, these forests were rendered unattractive to, and perhaps incapable of supporting their natural quota of, Acadian Chickadees, and hence the southward migration reaching to southern New England.

GENERAL NOTES.

The Western Grebe in Ohio.— On Tuesday morning, October 28, 1913, while passing Lake Glacier in Mill Creek Park, near Youngstown, Ohio, I observed a Grebe on the lake, which I was satisfied was the Western Grebe, *Æchmophorus occidentalis*.

I consulted Mr. Volney Rogers, the Park Superintendent, and he agreed with me that the appearance of the Western Grebe in this locality was of sufficient importance to justify the taking of this bird, and on Thursday, October 30, I shot it.

The skin is now at the Carnegie Museum in Pittsburgh, Pa.— GEO. L. FORDYCE, *Youngstown, Ohio.*

American Merganser (*Mergus americanus*) **at Boston, Mass. in Midwinter.**— On the Charles River, December 30, 1913, at 8.45 o'clock A. M. there appeared to be a movement towards the west, that is up the river, of American Mergansers. There was no wind, although the vane pointed west. Some skim ice in the river. I first saw eight drakes, and one female resting on the water near the edge of the ice, they soon took wing and passed by me. At this time there were three females diving near the stone wall, and two other females farther out. Then came a flock of twenty-two or three, about half and half males and females, they flew past me and were about thirty-five yards high, no notice was taken by those flying, or those resting on the water of each other. I also saw a few others resting on the water. During a period of fourteen years I have never seen so many of these birds in one day in Charles River. Those heretofore observed being in the spring where the ice breaks up, and the average seen during those fourteen years would not be more than a dozen or fifteen a year. On the afternoon of the above date at four and a quarter o'clock P. M. I saw a lone Ruddy Duck (*Erismatura jamaicensis*) in brown plumage.— GEORGE H. MACKAY, *Nantucket, Mass.*

Two Unrecorded Specimens of the European Widgeon from Massachusetts.— As the European Widgeon (*Mareca penelope*) has so rarely been taken in Massachusetts I wish to record a specimen in my collection taken at Ipswich, on October 25, 1909. The bird, an immature male, was shot by a gunner and sent into the Boston markets where it was recognized by Mr. John H. Hardy, Jr., through whose kindness it came into my possession.

Mr. A. C. Bent permits me to record another specimen, in similar plumage taken at Bridgewater on November 9, 1903, by Mr. J. E. Bassett and now in his collection (No. 1886, Coll. A. C. Bent). This is the first record of the occurrence of the species in Bristol County.— F. SEYMOUR HERSEY, *Taunton, Mass.*

Notes on the Habits of an Old-squaw (*Harelda hyemalis*) **and two Lesser Scaup Ducks** (*Aythya affinis*).— December 14, 1913, I found on a a section of the lagoons of Jackson Park, Chicago, Ill., a male Old-squaw and two female Lesser Scaup Ducks after a change in the weather from unusually warm and pleasant to cold with a brisk northeast wind. The Old-squaw remained until December 28; the Scaups were last seen December 22 when ice had formed over a greater part of the lagoon. All of the birds were tame, and continued about their affairs even when one was standing on the shore, providing he remained quiet, thus affording an unusual opportunity for observations on their habits.

It was not possible to watch the birds continuously throughout a day's time, but they were observed at varying intervals, which taken together come close to constituting a day's time from daybreak to dark and it was possible to check some observations by a few repeated periods. The following account, therefore, should give a fair idea of their general behavior.

The section of the lagoon on which they alighted is about 275 feet long and 125 feet wide in its broadest portion, extending in an east and west direction, at the east end opening on Lake Michigan and connecting on the west with the long river-like chain of lagoons which traverse the greater part of Jackson Park mainly from north to south.

The following is a summary of my observations. The Old-squaw was a quiet, totally silent bird, in contrast to the active Scaups, one of these at least, being very noisy. In feeding, the Old-squaw remained in deep water, never coming in so near shore as did the Scaups. The food, with the possible exception of the algae about the piling, could not be ascertained. Whatever it is, it would seem to be swallowed under water, always in the case of the Old-squaw, and with only one exception in the case of the Scaups. One of these was once seen to be engaged with food of some sort on coming to the surface after diving. In all probability the food was mainly animal. On January 13 an immense swarm of sluggish minnows, extending nearly across the lagoon, was noted at the west bridge, and these fish would have fallen an easy prey to an expert diver. That the Old-squaw is more expert in diving than the Scaups is indicated by its choice of the deeper water, and the much less time occupied in feeding. The male Scaup which appeared December 27 was once seen to go in close to shore where the water was too shallow for diving and feed by immersing its head only.

Whether the birds are active at night is an interesting question. Judging by their quiet behavior at dusk and their alertness at dawn one would say so.

Presumably the occurrence of the Old-squaw with the Scaups was due to a gregarious instinct rather than to sexual attraction. In general in the various activities the Scaups took the initiative, and paid little attention to the Old-squaw, finding sufficient company in themselves, while the Old-squaw followed them about through sheer loneliness. In

going to a feeding ground the Scaups followed the Old-squaw only when they themselves were thoroughly hungry, judging by their actions, and would probably have gone even if he had not. Even when the Old-squaw did precede, the Scaups were the first to dive. It is not improbable that the Old-squaw is a faster swimmer than the Scaups, and this may account for his preceding them at times. It has been noted that when the birds were thoroughly alarmed, the Old-squaw first tried to escape by swimming, while the Scaups took wing at once. More often the Old-squaw followed the Scaups a little way and then turned about, due no doubt to a gregarious instinct which was quickly overcome by an impulse to sleep, or the fact that he was satiated with food. Occasionally he completely ignored them, and this was at a time when satiety or the sleep impulse or both were strongest. Almost invariably the Old-squaw would not allow the Scaups to come too near, and remained about twice as far from them as they were from each other, at least while inactive, and all were scattered somewhat while feeding. Generally the Old-squaw moved away when a Scaup approached him too closely; in one instance he was seen to wake suddenly and rush at the nearest Scaup with open bill, a phenomenon I have seen among the ducks in the big flying cage at Lincoln Park, Chicago.

How strong the gregarious instinct is in ducks is shown in the behavior of the solitary individuals of different species which alighted on the lagoon after the Scaups had left, both river ducks and sea ducks. There is little likelihood of sexual attraction between the members of different subfamilies, indeed, a Black Duck generally kept to itself at the western end of the lagoon, being at one period of observation close to a Mallard, a member of its own subfamily, just on the other side of the bridge, but separated by a flood-gate.

The gregarious instinct would seem to be further confirmed in the case of the Old-squaw twice following a gull for a short distance during the absence of the Scaups, as if mistaking it for a duck. Herrick [1] cites a case of a shrike attempting to impale prey in a maple, under the pressure of a strong impulse not being able to distinguish the maple from a thorn bush. This author also states that all intelligence gives way under the presence of stronger instincts. The case of the Old-squaw and the gull, it seems to me, is somewhat analagous to that of the shrike.— Edwin D. Hull, *Chicago, Ill.*

American Egret (*Herodias egretta*) **in Rhode Island.**— Seeing Mr. Noble's record of the American Egret on Martha's Vineyard reminds me to record the following observation. In August, either on the 15th or 16th, 1913, while crossing the road that skirts the salt marsh just after crossing Stone Bridge, Tiverton, on to the Island of Rhode Island, I noticed from

[1] Herrick, F. H. Instinct and Intelligence in Birds. III. Pop. Sci. Mo. 77: 82–97, 1910.

an automobile a white heron — I think undoubtedly of this species — feeding by one of the pools. Mr. Lyman Underwood, who was spending the summer in the same township with me (Nonquitt, Mass.), saw several white herons a day or so later at the same place, as he also passed in his automobile, and later I was asked by residents of Wareham, Mass., if white herons should be seen in that locality. Apparently there was a flight during August, 1913.— R. Heber Howe, Jr., *Thoreau Museum, Concord, Mass.*

Notes on an Unusual Flight of Stilt Sandpiper (*Micropalama himantopus*).— While walking through the Boston Markets on August 12, 1912, I was surprised to find large numbers of Stilt Sandpipers offered for sale. This species is rather uncommon and although a few generally occur each fall I had never before seen more than twenty or twenty-five in the market at one time. On this date nearly every stall had bunches of them and at one place I saw a large hamper filled with shore-birds nearly all of which were this species. There were a few Yellow-legs and Ruddy Turnstones in the lot but I estimated that there were not less than two hundred Stilt Sandpipers in this one stall. The proprietor, whom I personally know, informed me that all came from Ipswich, Massachusetts, or the immediate vicinity. I could not learn from the other dealers where their birds had been shipped from but there is little doubt that practically all came from points along the Massachusetts coast.

The presence of so many birds in the market would seem to indicate an unusual flight along the coast and the following observations made on Long Island, N. Y., on the same date by my friend, Mr. John Treadwell Nichols, of the American Museum of Natural History, may throw some light on the extent of this flight. With his kind permission I quote the following from his letter.

"On August 12, 1912, I observed an unusual flight of Stilt Sandpipers at Mastic, Long Island. In about three hours time, in the early morning, approximately 200 birds passed by a single set of stool (decoys). They were in flocks of varying size, and mixed with them were a very few Lesser Yellow-legs and Dowitchers. The Stilt Sandpipers taken and observed (and I imagine all the rest) were in barred plumage." — F. Seymour Hersey, *Taunton, Mass.*

Franklin's Grouse in Colorado.— While recently securing data and notes on the "game birds" of Colorado from Mr. Bryan Haywood, who has for years shot these birds all over the west, I was pleased to learn that Mr. Haywood had shot a Franklin's Grouse (*Canachites franklini*) at Palmer Lake, Colo., in September, 1896. I accept this record unhesitatingly because the bird was shot, and examined, and because Mr. Haywood is thoroughly familiar with the species, having killed many in Montana. This bird can be classed only as a straggler in Colorado, and this record is the first, so far as I know, for the state.— W. H. Bergtold, *Denver, Colo.*

Sharp-shinned Hawk in Maine in Winter.— On January 6, 1914, a bird was brought to me for identification. It had flown into one of the storehouses on the post on January 3 and died January 5. It proved to be a very large male Sharp-shinned Hawk (*Accipiter velox*).

This is the fifth record of the occurrence of this bird in Maine during the winter months.— LIEUTENANT G. RALPH MEYER, U. S. A., *Ft. McKinley, Me.*

Extreme Emaciation in a Specimen of the Snowy Owl (*Nyctea nyctea*).— On the first of January, 1914, I received from Mr. Edward S. Schmid, of Washington, D. C., a fine specimen of this owl. The bird had died about an hour before it came into my hands. It had been captured in northern Virginia while sitting on a low bush in the woods, the captor simply walking up to it and slipping a bag over the bird as it sat there, apparently in a dazed condition.

When I first picked the specimen up it seemed to me to weigh but little more than a handful of feathers, so light was it. After removing the entire skin, from base of beak to claws, a most remarkable looking specimen was presented to my view. The bird had been shot with coarse (No. 4) shot, apparently a long time before its death, but the pellets were only in the superficial muscles of the back and pinion; whether they had deprived it of flight or not I cannot say. However, it was very clear that this owl had not eaten anything for a great length of time. All the evidences of extreme emaciation were present, and to a degree never before witnessed by me in any bird. The stomach was entirely empty, and all the organs and viscera of the thoracic cavity and abdomen were reduced almost to a state of atrophy. There was no adipose anywhere, but the most remarkable sight was the muscles. These were all flabby and of a very pale flesh-color; and the entire system was reduced almost to its tendons and fasciæ. As to the large pectoral muscles, they were so thin that the sternum and ribs could be seen through them, and I am very sure they were useless for the purpose of flight.

Sir Richard Owen, in describing the nervous system in birds, makes no mention of the coracoid bones in owls being pierced, antero-posteriorly, by a foramen near the middle of their shafts for the passage of a nerve. This I long ago pointed out to be the case in *Speotyto* (Bull. U. S. Geol. and Geogr. Surv. of the Terr., 1883, p. 107), and in regard to the character in this genus I stated: "This foramen transmits a branch of that cervical nerve coming from between the twelfth and thirteenth cervical vertebræ."

Now in this extremely emaciated Snowy Owl the nerves and vessels could all be traced and studied with remarkable ease and celerity. In it, the aforesaid nerve, passing, as usual, through the coracoid bone, is the most anterior one of the brachial plexus, with which it is incorporated in the common sheath, making no anastomotic connections with the other branches.— R. W. SHUFELDT, *Washington, D. C.*

Another Species Added to the Avifauna of South Carolina.— On the afternoon of December 15, I heard that a strange bird had been seen, since the morning of the 9th, around Chisolm's Mill on the Ashley River at the foot of Tradd Street, Charleston, and on going down on the morning of the 16th, I shot the bird, after a chase of ten minutes, as it lit on a side fence. It proved to be an Arkansas Kingbird (*Tyrannus verticalis*) a new species for this state. The bird is a young male in somewhat frayed plumage. The flame-patch on the crown is very indistinct.

On dissection I was very much surprised to find that the stomach contained, besides insect remains, a fiddler crab and about a dozen seeds. The winter dearth of insect life probably forced the bird to resort to this unusual food.

In coming to South Carolina this Kingbird had wandered one thousand miles east of its regular route. This record is the seventh east of the Mississippi and the southernmost, by over 400 miles, of the four Atlantic state records. The skin is now in the Charleston Museum.— E. Burnham Chamberlain, *Charleston, S. C.*

The Arkansas Kingbird (*Tyrannus verticalis*) **in Rhode Island.**— Last fall I spent at Watch Hill, R. I. The migration reached its height on September 24. I was working towards a small swamp, trying to count the birds, as the trees, bushes and grass were literally swarming with them. A large flycatcher suddenly flew out of an oak tree in front of me, and settled on a dead branch near the ground about 75 feet away. While on the wing it looked exactly like a Kingbird, and as this would have been an uncommonly late date I hurried up to get a closer view with my binoculars. What was my surprise when I discovered that my Kingbird had bright yellow underparts and no white band on the tip of its tail. There was no doubt but that it was an Arkansas Kingbird. The slate gray back with a very faint tinge of olive and the absence of any rufous on the tail distinguished it from the Crested Flycatcher, not to mention that its shape and flight and habits were totally different. I watched it for half an hour, several times getting within very close range. This is the first record for the state of Rhode Island.— Ludlow Griscom, *New York City.*

Capture of Myiarchus crinitus (Linn.) in Eastern Cuba.— A specimen of the Crested Flycatcher, in fine condition, was shot on February 18, 1913, in the woods at the San Carlos Plantation at Guantánamo, Oriente Province. This is the fourth record for the Island, and the first for eastern Cuba, as Gundlach's three records are from the western end.— Chas. T. Ramsden, *Guantanamo, Cuba.*

An Unusual Observation on the Crow (*Corvus brachyrhynchos*) **at Lubec, Maine.**— I have seen non-raptorial birds of various species attack other birds in self defense, or in defense of their nests and young, but

today (December 31, 1913) while on a tour of the local places where birds are to be found in winter, I made an observation new to me, and while actually interesting and thrilling, it was exasperating and disappointing. While walking along a stretch of sandy beach with a companion we suddenly flushed a belated shore bird, without having time to bring our glasses to bear upon it; from the shape of its wing, mode of flight and general coloration we were quite sure that it was a Sanderling. The bird took a course directly ahead of us, and along the water's edge; so we followed hoping to positively identify it.

Three hundred yards in advance of us, sitting on the beach was a flock of about two hundred Crows quietly basking in the sun. As soon as our bird drew near them it swerved out over the water, when one of the Crows rose and flew directly at it.

The smaller bird dodged repeated attacks and was drawing ahead, when another Crow at the farther end of the flock, seeing the escape flew out to intercept it and turned the Sanderling (?) back, giving the first assailant an opportunity to swoop down and deliver a telling blow with its wing. The smaller bird fell, but recovered itself before touching the water. Then to avoid its two assailants it was obliged to fly towards the land and directly over the large flock of Crows, when about twenty of their number rose in a bunch and bore the unfortunate to the beach, all endeavoring to get at it at the same time. As soon as we discovered the little fellow's real danger, we ran and shouted, but they did not heed us until close upon them, when they flew off leaving nothing but a small piece of breast with feathers attached, the body being carried away.

We followed them up from one place of alighting to another hoping to find a wing or some part of the body but without success.— Clarence H. Clark, *Lubec, Maine.*

Starlings (*Sturnus vulgaris*) **at Providence, R. I.**— It may be of interest to the readers of 'The Auk,' in following the movements of the Starling to know they have appeared in Providence, R. I. My business requiring my presence in this city for a few weeks, on the morning of November 23, I started out with my field glass to see what could be seen here in the line of bird life. In passing through Swan Point Cemetery I was not a little surprised to encounter a flock of about forty Starlings, many of them in full summer plumage; they were constantly in song, many times singing notes quite like our Bluebird. I have had other excellent observations of them covering a date as late as December 6.

In the same section on December 1, 1912, I found two Mockingbirds but have failed to record them this season.— E. E. Caduc, *Boston, Mass.*

Starlings (*Sturnus vulgaris*) **in Cambridge, Mass.**— A flock of Starlings numbering about sixty birds appeared at Fresh Pond in Cambridge, in late November, 1913. They were first seen by me on the 27th day and have been successively observed up to the middle of February, the time of

the writing of this note. Occasionally the flock has been divided and fewer individuals only have been seen; yet it appears to have remained essentially intact, for on February 4 and 13 the number was reckoned as fifty or more. On December 25 seventy-three birds were actually counted, as they passed in squads in the same direction from one group of trees to another group. On January 30 one was singing very prettily, perched high and alone in an oak. This is the first flock to appear in the vicinity of Boston. A single bird only has been hitherto reported, seen at Squantum Head, March 26, 1912 (Auk, XXIX, July, 1912, p. 394), which disappeared and was not further noted. The Cambridge flock has remained in and about the Fresh Pond reservation. It is interesting that an employee in the park, who told me that he was fifteen years from Ireland, recognized these birds at once on their appearance, feeling sure they were what were called in the Old Country 'Stares,' in England, Starlings. He was pleased to have the identification confirmed.— HORACE W. WRIGHT, *Boston, Mass.*

The Rusty Blackbird (*Euphagus carolinus*) **in Connecticut in Winter.**— On January 18, 1914, I observed two Rusty Blackbirds in Edgewood Park, New Haven, Conn. The birds were in a portion of the park that is rather swampy in character. These swamps are evidently fed by springs, as the shallow water does not freeze throughout the year. This makes the third winter record for this species in Connecticut. The other two are both December dates and are regarded, probably correctly, as instances of late fall migration (Birds of Connecticut, 1913, p. 115). It is interesting to note that both of these December records — one by Mr. C. H. Pangburn and one by myself — are from this same swampy area in Edgewood Park.— ARETAS A. SAUNDERS, *New Haven, Conn.*

The Bobolink (*Dolichonyx oryzivorus*) **as a Conveyer of Mollusca.**— On April 18, 1913, there appeared some flocks of northward bound Bobolinks; a rare bird at this time of the year, as they usually pass at night, without stopping, on their northward trip; quite the contrary to their fall migrating habits, when they stay with us, in great numbers for nearly a month. I shot three or four birds, all males, and was very much surprised to find live Mollusca among their feathers; having sent some of the snails to Dr. H. A. Pilsbry, of the Academy of Natural Sciences of Philadelphia, for determination, he kindly informed me that they were *Succinea riisei* (Pfr.) known from the Islands of St. Croix and Porto Rico, but not from Cuba. It would be interesting to know the date of arrival of the Bobolinks at Porto Rico in the Spring of 1913, and thus tell whether the shells came from there or from St. Croix.— CHAS. T. RAMSDEN, *Guantanamo, Cuba.*

Cowbird Note.— May 30, 1909, I was lying partly hidden behind a log at Westerly, R. I., and trying to discover the nest of a pair of Black and

White Warblers (*Mniotilta varia*) by the actions of the old birds. A short time after taking up my position a female Cowbird (*Molothrus ater*) came flying through the trees and lit but a short distance away. From time to time I glanced at her to see what she was up to but was unable to see that she had moved a muscle for some twenty minutes, for which time she remained hunched up as if asleep. Then she flew straight to the nest of a Red-eyed Vireo (*Vireosylva olivacea*) which though but ten feet from my hiding place, was so well concealed that it had escaped my attention. After remaining on the nest about two minutes she flew out of sight among the trees. Upon investigation I found the nest to contain two eggs of the rightful owner and one of the Cowbird.— A. Brazier Howell, *Covina, Cal.*

Evening Grosbeak (*Hesperiphona vespertina vespertina*) **at Boston, Mass.**— On December 29, 1913, while going through the Arnold Arboretum looking for birds, a friend and I saw one which we took to be a female Evening Grosbeak, although we failed to get a good view of it. The next day I went alone to the same spot and found the bird feeding on the ground near a hop-hornbeam tree. I approached slowly within two rods of it and watched it for nearly half an hour. The markings were very distinct in the bright sunshine and there was no doubt about its identity. I could not make out whether it was feeding on grass and weed seeds or something else. At length on the approach of a man from the opposite direction it flew up into the hornbeam and from there to the big oak, where I left it. I saw it again on January 1 and 2 and was told that it was seen in the same spot December 31. That makes in all five successive days and would seem to indicate that it intended to stay there for some time.— Edward H. Atherton, *Roxbury, Mass.*

The White-winged Crossbill (*Loxia leucoptera*) **in the District of Columbia.**— Within the close of the rectory of Trinity Episcopal Church at Takoma Park, D. C., are three scrub pines, *Pinus virginiana*, of medium size, densely laden with cones. Two of these, one on each side of the walk leading to the steps, extend their branches within ten feet of the front porch where, alone, I was quietly sitting in a rocking chair about 3 P. M. October 23, 1913, literally basking in the hospitable rays of the sun rapidly declining after a bright, but rather brisk, wintry day. I had been on the porch but a few minutes when I discovered several birds assiduously searching the cones in the further one of these two trees. Their movements strangely suggested paroquets and were accentuated by plaintive notes constantly emitted. They were White-winged Crossbills, eight in number. They gradually worked their way to the tree directly in front of which I was sitting, and ultimately reached the very ends of the branches within ten feet of me. I followed their every movement for upwards of fifteen minutes. They left the tree precipitately in a body. About three quarters of an hour later I saw and heard them in a grove of larger pines two squares distant.

This is the first definite published notice of the White-winged Crossbill in the District of Columbia, and the only other satisfactory record of the species in the District is that of Mr. James H. Fleming, of Toronto, Canada, who saw one in the grounds of the Department of Agriculture in November, 1906 (Richmond MSS).

Mr. Jouy included the species in his 'Catalogue of the Birds of the District of Columbia' [1] but this was nothing more than a nominal list and the basis for the inclusion of the bird does not appear.

There are other records of the species in papers on the ornithology of the District and vicinity, but they are all of birds seen or taken in adjacent portions of Maryland. The authors of 'Avifauna Columbiana' [2] say: "We said of these species (*Loxia curvirostra minor* and *Loxia leucoptera*) in the original edition that both undoubtedly sometimes make their appearance in severe winters, though we had not been able to ascertain the fact with certainty. It has since been established, and both the Crossbills have been introduced as stragglers in Mr. Jouy's catalogue. Mr. William Palmer states in a note addressed to us:. . . .'I have myself never seen the White-winged Crossbill here, but Mr. Henry Marshall has specimens which he shot at Laurel, Md., about eight years ago, probably 1874, since which time he has seen none.'"

One is said to have been taken about 1864 by Mr. Drexler, but there is no certainty that this was in the District. Mr. Oldys' records one as having been accidentally killed on August 12, 1907, at Oxon Hill, Md., about four or five miles southeast of Washington.[3] Prof. Cooke adds nothing to the foregoing in his 'Bird Migration in the District of Columbia,' [4] and Dr. Richmond's inclusion of the species in his 'List of Birds Found in the District of Columbia," published in Mrs. Maynard's 'Birds of Washington' is based upon no additional records.— R. W. Williams, *Takoma Park, Md.*

Unusual Nesting Site of the English Sparrow.— As the English Sparrow (*Passer domesticus*) will cheerfully nest in almost any situation, unusual nesting sites would seem to be almost an impossibility, but nevertheless I think that the following should be put in that class. Near my home during the summer of 1909, between Westerly and Watch Hill, R. I., there was an artificial ice plant. In the outside sheathing of this building was cut an opening through which ran a steam exhaust pipe, and as the hole was cut a little large, there was a handy entrance to the interstices of the wall, about an inch and a half square. On July tenth I discovered that a pair of English Sparrows had a nest full of large young in this retreat. Upon investigation I found that the pipe was hot enough to blister one's

[1] Field and Forest, II, 155, March 1877.
[2] Bulletin No. 26, U. S. Nat. Museum, 2nd. Ed., 1883.
[3] Auk, XXIV, 442.
[4] Proceedings of the Biological Society of Washington, XXI, 115, April, 1918.

hand, and past this the old birds were obliged to squeeze while entering and leaving. The nest proper was a foot or so further along. I cannot see how the young birds could exist for a day without being partially roasted. They must have had to endure over 150 degrees of heat.— A. Brazier Howell, *Covina, Cal.*

Swainson's Warbler (*Helinaia swainsoni*) **at Guantanamo, Cuba.**— I shot a male of Swainson's Warbler on January 18, 1914, in the heavy timber at the San Carlos Plantation, Guantánamo, Cuba. The bird was feeding on the ground among the dry leaves, was not a bit shy, and in fine plumage. This is the first record for this end of the island, and the second for Cuba; the other being by Gundlach at Cojimar near Havana, on the north coast.— Chas. T. Ramsden, *Guantanamo, Cuba.*

Magnolia Warbler in Colorado.— I secured a male of this species *Dendroica magnolia* in Denver, Colo., on May 20, 1913. This is a rare warbler in this state; and it is interesting to see that all the previous records, numbering six, show the birds as occuring in May, between the 17th and the 22nd, the single exception being May 12.— W. H. Bergtold, *Denver, Colo.*

Canadian Warbler in Colorado.— A female of this species, *Wilsonia canadensis*, was shot by the writer at Parker, Colo., on Sept. 9, 1913. Parker is about fifteen miles east of the 'foothills,' and nearly sixty miles west of the only other locality in the state where this warbler has been seen, to wit, Lake, Lincoln Co., where it was reported by Aiken as seen and shot, on May 23, 1899.— W. H. Bergtold, *Denver, Colo.*

The Short-billed Marsh Wren (*Cistothorus stellaris*) **on Long Island in Winter.**— On December 28, 1913, Messrs. George W. Hubbell, Jr., Nicholas F. Lenssen and I were at Jones Beach, Long Island, for the purpose of studying waterfowl. During the afternoon, while searching for Myrtle Warblers and sparrows in a large tract of bay-berry bushes Mr. Lenssen found a bird unknown to him, which proved to be a Short-billed Marsh Wren. It was perched on a bush about a foot from the ground eyeing us with great curiosity. The bird by its actions was half-dead with the cold, as it permitted the three of us to approach within four feet, and finally flew away passing between two of us who were not more than two feet apart. It was finally stunned with a bay-berry stick and caught alive. This is the fourth record of the occurrence of this species on Long Island, and so far as I know, the first winter record for New York state. The specimen is now in the American Museum of Natural History. — Ludlow Griscom, *New York City.*

The Red-bellied Nuthatch (*Sitta canadensis*) **Feeding among Weeds.** — The Red-breasted Nuthatch occurred in unprecedented abundance in

northeastern Philadelphia during the fall of 1912, making that year a notable one for its irregular invasion. It arrived as early as September 4, when I observed the first one, which is my earliest record by 21 days, and remained until November 12.

A remarkable feature, to me, about the occurrence of this little *Sitta* here during that fall, was their habit of frequenting water courses fringed with dense growths of giant ragweeds (*Ambrosia trifida*), in which they sought food on the thick stems, petioles and leaves, often feeding close to the ground. I always regarded this nuthatch as a denizen of the forest and its occurrence in these weedy growths surprised me. They exhibited no fear as I entered the weeds, and if I kept quiet, they fed fearlessly within close proximity of me, often only a yard away.

On September 12, I observed in *Ambrosia* weeds along Frankford Creek, at Frankford, seven Red-bellied Nuthatches, four being in sight at one time. This is the largest number of these birds I have ever seen at one time.— Richard F. Miller, *Frankford, Phila., Pa.*

The Acadian Chickadee (*Penthestes hudsonicus littoralis*) **at Watch Hill, R. I.**— On the morning of October 30, as I stepped from the house, it was obvious that there was a phenomenal flight of Chickadees (*P. atricapillus*), they were everywhere, in the bushes, hopping over stones in a field, and strung out along a telegraph wire. Some hours later I was walking down a road through some woods, bordered on each side by tangles of vines and bushes, full, of course, of the omnipresent Chickadees. Suddenly close behind me I heard a familiar, hoarse, *tsi'h-a, da'y, da'y*, bringing back memories of days spent in the north woods. I turned quickly around, discovered an Acadian Chickadee about twelve feet away working his way through the vines, calling repeatedly to his comrades, the Black-capped Chickadees, not far away. The dark brown cap, the brownish back and the rufous sides contrasted very markedly with the gray, black and white of *atricapillus*. Even at a distance of 100 feet I found that the Acadian was easily distinguishable from the common species with binoculars. The next day, October 31, a flock of four were feeding in some bushes bordering the golf-grounds. As this was the second record of the occurrence of this species in the state, and there was what might almost be called a flight for so rare a bird, I tried to collect one with a cap and golf-sticks but was unsuccessful, succeeding merely in getting very close. On November 5 several miles away on Napatree Point I saw a single Acadian Chickadee in a little tree near some cottages, and a little farther on two more climbing over a crate. These were the last birds I saw.

When I arrived in New York City, I received interesting confirmation of my observation in that this species had been noted around Boston by several observers in several localities. Recently, I have been informed that they have been reported from Connecticut. Previous to this winter its status in southern New England seems to have been as follows — very rare winter visitor to Boston, one record for Rhode Island, and one for Connecticut.— Ludlow Griscom, *New York City.*

The Identity of Hypodes cinerea Cassin.— In the January number of the 'Journal fur Ornithologie' Dr. O. Neumann suggests that the type specimens of Cassin's *Eopsaltria cinerea* (Proc. Acad. Nat. Sci. Phila., 1856, p. 253 — afterwards *Hypodes cinerea*) are the same birds that he refers to as "*Muscicapa*?" in the Proceedings for 1859, p. 51. As Dr. Neumann states I have already given my opinion that these birds which later became the types of *Muscicapa cassini* Heine are referable to *Muscicapa lugens* Hartlaub. Upon comparing them with the description of *Hypodes cinerea* I think there is no question but that Dr. Neumann's conjecture is correct and that they are the types of this species also. So far as I can ascertain the Du Chaillu specimens were not labelled at all until Cassin studied them and they were then mounted. Undoubtedly he failed to label them after publishing his description or his label was removed when they were mounted and they then became mixed with the second Du Chaillu collection and were redescribed under the caption "*Muscicapa* sp." upon which description Heine based his name.

My 'Catalogue of the Muscicapidæ' was based upon the specimens and as there was no specimen marked *Hypodes cinerea* I did not include it, not knowing indeed that it belonged to this family. Later in my Catalogue of Cassin's types (Proceedings for 1899, p. 39) I stated that it was not to be found, which is not remarkable under the circumstances!

I consider that Dr. Neumann is right in placing both this bird and *Parisonia olivascens* Cassin in *Alseonax*, so this species should now be known as *Alseonax cinereus* Cassin of which both *Muscicapa cassini* and *M. lugens* are pure synonyms.— WITMER STONE, *Acad. Nat. Sci., Philadelphia, Pa.*

Some Marshalltown, Iowa, Notes.— During the fall migration of 1913 it has been my good fortune to secure specimens of several species of birds which are uncommon in this vicinity.

Pelecanus erythrorhynchos. WHITE PELICAN.— On September 28, four of this species were shot in this vicinity. Three of these were taken by hunters and brought into town and the fourth was discovered by the writer a day or two later. Some one had shot it, stripped off the wings and left the body to decay. Of the three birds brought to town the writer secured one and the other two were secured by one of the stores for window display. The specimen I secured was an immature bird too badly shot for the sex to be determined.

Charadrius dominicus dominicus. GOLDEN PLOVER.— On October 4, I had the good fortune to secure a female golden plover. The bird was alone on a mud flat and took wing as I approached. This was the only individual that I noted but a hunter told me a few days later that he secured four at the same place on about the same date.

Cathartes aura septentrionalis. TURKEY BUZZARD.— An immature female was taken on October 4, and another one noted. The second bird remained in this vicinity until the twelfth.

Buteo lineatus lineatus. RED-SHOULDERED HAWK — A specimen of

this species was taken October 25, in the heavy timber along the river. The sex was not determined. This is the only individual of this form I have ever noted in this vicinity.

Pandion haliaetus carolinensis. OSPREY.— On September 20, while walking along the river I noted two of this species flying over the water. After waiting on the bank for over an hour I secured one, an adult female. The other one remained about the same place for several days and then disappeared.— IRA N. GABRIELSON, *Marshalltown, Iowa.*

Two Species New to Colorado.— Recent investigations in the ornithological collections of the Colorado Museum of Natural History, have revealed some interesting facts and important records heretofore unpublished.

One of the most noteworthy of these is an adult specimen of the rare Yellow Rail (*Coturnicops noveboracensis*) taken and identified as an immature *Porzana carolina* by Mr. L. J. Hersey of this city. As the bird is unquestionably fully adult, the 'immature' on the label is obviously an error by Mr. Hersey. The specimen is in fairly good condition and appears to be typical. It was taken at Barr, Colo., some time during July, 1906, exact date not given, which would suggest the possibility of a breeding record.

I also desire to record a specimen of Sennett's Night-hawk (*Chordeiles virginianus sennetti*) taken at Barr, Colo., Aug. 8, 1910, by Mr. Hersey. The identity of this specimen was ascertained by Mr. H. C. Oberholser of the Bureau of Biological Survey, Washington, D. C.

Both of these specimens form first records for their respective species in Colorado, and, in the case of the rail, one of the few for the western United States.— F. C. LINCOLN, *Denver, Colorado.*

Unusual Occurrences at Madison, Wis.— Toxostoma rufum. BROWN THRASHER.— A specimen in normal condition was taken January 25. The stomach contained the skins and seeds of the wild grape.

Passerherbulus lecontei. LECONTE'S SPARROW.— Three were seen on October 12, and one collected. Another seen October 19.

Hesperiphona vespertina vespertina. EVENING GROSBEAK.— Two female birds were seen December 14.

Porzana carolina. SORA RAIL.— On December 28 while walking through a frozen marsh two Soras were seen running through the rushes. One bird was caught and found to be minus the right wing. The extreme minimum temperature for December was 13° and mean minimum 25.9°; mean monthly temperature 32°. It is not extremely unusual for a few Soras to remain until the marshes freeze, but this would seem to be a case of unusual endurance. *En passant* Butler in 'Birds of Indiana' writing of this species says "they are very sensitive to cold." — A. WILLIAM SCHORGER, *Madison, Wis.*

Effect of Cold on Moult.— In the American Naturalist for 1908 Mr. C. W. Beebe reported some experiments on male Scarlet Tanagers and Bobolinks to determine the effect of external factors on moult and its sequence. His birds, confined in the dark, and rather over fed, held their nuptial plumage all summer and winter, and when brought into normal conditions the following spring, moulted from nuptial to nuptial, thus reversing the proper order.

In 1911 I made an experiment on a male Mallard Duck to determine primarily the effect of cold upon the moult. I chose a Mallard of the toy variety because of its small size. At the same time I took as a control another male toy duck and placed them both in crates of similar sizes, about two and one half by one and one half feet.

The experiment was begun on April 15, 1911, when of course all Mallards are still in full dress. I was enabled to keep the bird to be experimented upon together with another animal experiment in a special room of the Quincy Cold Storage Plant in Boston, thanks to the kindness of Mr. G. V. Crocker. The room was kept at an even temperature of 25° F. Rarely it got as warm as 30° or as cold as 22°. It was practically dark, though lighted at times by electricity.

Both the cold room duck and the control duck were fed on the same ration of hard grain. Notes were made of both birds from time to time, and the cold room bird was visited about every ten days.

The observations in detail are added, but to sum up, the cold room bird kept his winter plumage all summer without shedding a feather and was taken out about November first and placed with the other ducks at Wenham. He remained the same all winter and moulted very early in the spring, rapidly assuming eclipse plumage.

The control duck, likewise closely confined, but out of doors assumed an eclipse plumage, although not a perfect one, and when liberated at the same time as the other bird, took on a delayed and rather imperfect winter dress. Both birds were very fat, but otherwise in perfect health throughout the whole period.

It is perhaps to be regretted that the control bird was not kept through the summer in the dark, as this would have tended to rule out the light factor. This factor may or may not have had a positive effect.

It is certain that close confinement alone greatly delayed and rendered less perfect the spring to summer and summer to winter moult in the control bird, but it had no such effect as the cold and dark plus the confinement. The sequence of plumage was certainly governed by the season, as no attempt was made on the part of the cold room bird to change his left over winter dress when he was liberated in November.

The following notes were made at the time.

April 15, 1911. Experiment started.

June 24: The cold room bird showed no moult, breast worn from the bars of the crate, and a small area of skin around both eyes denuded of feathers. Other mallards at Wenham were beginning to moult at this date.

July 2: Control duck shows delayed moult, which is not to be wondered at on account of lack of exercise. So far only head and breast feathers affected.

July 27: No change in cold room bird.

August 8: The control duck shows black under tail coverts nearly gone, green on occiput and hind neck only, with a patch of it on the throat. White neck ring reduced, and absent dorsally. Breast nearly all moulted except for few old feathers at lower margin of the chestnut area. Flanks are moulting. The common mallards show at this date a much later and more complete eclipse plumage.

August 13: Cold room bird, no change except increased wear of feathers. Belly and under tail coverts badly worn. Sex feathers intact. Feathers coming back around eyes.

August 22: Cold room bird no change. Control bird, eclipse dress progressing slowly. The belly, however, is not yet moulted and there are still traces of neck ring laterally. Some of the mallard stock in perfect eclipse at this date; others slightly lacking. A good deal of variation among them. None show any white neck ring now, but several have greenish heads.

September 14: Cold room bird no change.

September 21: Control bird shows a beginning of the return of winter plumage, but eclipse has not been perfect.

Oct. 28: Cold room duck same as a month ago. (He was removed a few days after this, and remained without change all winter. The control was also liberated, but did not quite get back into full plumage and remained below par all winter.)

March 5, 1912: Control bird was noted as in ragged plumage with slight admixture of eclipse feathers on breast and on head. Cold room bird same — full winter dress but worn.

June 12: Control bird has started in to moult early, far earlier than any other mallard or toy mallard on the place. Breast spotted, belly partly moulted, sex feathers still intact, head brownish. The cold room duck is not so far advanced as the control, but more so than the other toys and mallards. Some mallards have not shed a feather yet. The center of the chestnut area of the cold room duck is changing and spotted, but not upper and lower margins, which are still pure chestnut, with young feathers underneath old feathers. Sex feathers intact.

From this time on eclipse plumage was rapidly assumed by both birds, and a stage maintained somewhat ahead of the other ducks on the place.— J. C. Phillips, *Wenham, Mass.*

RECENT LITERATURE.

Millais' 'British Diving Ducks.' [1]— The literature of ornithology more than that of any other branch of zoölogy is noteworthy for the splendidly illustrated folios and quartos which combine in such a pleasing way the labors of the artist and naturalist. It is gratifying to know that the day of such works is not yet passed — indeed the latest addition to this class of literature, Mr. Millais' 'British Diving Ducks,' has few equals in point of beauty of illustration, while the text is far ahead of the older illustrated works in its comprehensive and scientific treatment of the subject.

There are charming colored plates of the adult birds by Thorburn, figures of the 'eclipse plumages' by O. Murray Dixon, and of the young by Grönvold, while reproductions in monochrome of paintings, mainly by the author, illustrate flocks of ducks in action, especially, in courting displays which are extremely attractive and instructive. Photographic reproductions taken direct from skins illustrate changes of plumage with great detail.

The habits of the several species are described quite fully and with abundant quotations from the works of European and British authors. We notice here and there however a tendency to carelessness in matters of quotation, mis-spelling of names of authorities, etc., while the literature of the subject especially as regards American writers has not been so exhaustively covered as one would desire in a work such as Millais has brought out.

In nomenclature he follows the latest list of British birds except that he includes Steller's Eider in the genus *Somateria* and groups together the Golden-eyes, Bufflehead, Old-squaw and Harlequin under *Clangula*,— being thus an extremist among generic 'lumpers.' No less than six races of the Eider are mentioned, one being the very distinct *S. dresseri* usually regarded as a species, while others are so slightly differentiated as to be indistinguishable — at least from the data presented. For example a new form, *S. mollissima britannica*, is described as smaller than *mollissima* or *borealis* and larger than *fœroeensis* with the bill dull olive green above, shading into French blue-gray below, and again into pale yellowish near the nail. The bill of *mollissima* is given as olive green. No subspecies are discussed under other species and no other new names are proposed.

---

[1] British | Diving Ducks. | By | J. G. Millais, F. Z. S., M. B. O. U., Etc. | Author of "The Mammals of Great Britain and Ireland," "Newfoundland | and its Untrodden Ways," "The Natural History of British Surface-| Feeding Ducks," "The Wild Fowls in Scotland," "The Natural | History of British Game-Birds" etc. | Vol. I. With thirty-two plates (twenty-two of which are coloured) | by Archibald Thorburn, O. Murray Dixon, H. Grönvold | and the Author | Longmans, Green and Co. | 39 Paternoster Row, London | New York, Bombay, and Calcutta | 1913 | all rights reserved. Large 4°. pp. 1–141.

Vol. II | with forty-two plates (seventeen of which are coloured) pp. 1–164. £12 12s. for the two volumes.

It is Mr. Millais's discussion of plumage changes in the diving ducks that naturally attracts most attention. He was formerly a strong adherent of the theory of 'aptosochromatism' — color change without molt — and the reviewer[1] some years ago had occasion to challenge his views on the plumage change of the Sanderling,[2] showing that the feathers that were supposed by Mr. Millais to undergo change of pigment remained unchanged from their emergence from the pin feather sheath until lost in the next molt.

While Mr. Millais has now in a great measure abandoned his earlier views, he is still loath to relinquish entirely the possibility of direct color change. He speaks of the wearing away of the surface of a feather so as to disclose underlying pigment of a different color as a possible explanation of certain changes, "but," he adds, "it does not explain the remarkable 'rise' of colour that comes with the curly feathers of the tail [of the Mallard] in August. These feathers (which are only renewed once in the year) come in rich brown with a black center. So they remain for a short period, but late in September as they elongate and curl, they begin to turn black until by the end of the month they are jet black. A rise of colour must therefore be in course of movement the whole period as the feather elongates and must prove that there is a means of transmission either through veins or figment [sic] cells of infinitesimal size." While our author quotes Mr. Pycraft in opposition to his views, he makes the rather weak contention that Mr. Pycraft did not use a very high power microscope in his investigations, and possibly failed to see the "infinitesimal cells" to which he alludes. He however makes no reference to Dr. R. M. Strong's able paper on 'The Development of Color in the Definitive Feather'[3] which to our mind dismisses the possibility of any change of pigmentation such as Mr. Millais claims and we are inclined to think that the changes which he still attributes to 'aptosochromatism' will eventually be fully explained in the same manner as were those of the Sanderling. It is in discussing plumage change especially that Mr. Millais shows his lack of familiarity with the publications of American ornithologists; at least he makes no allusion to them.

The long series of photographs of Eider skins illustrating the molt of this species could we think have been made far more useful if they had been differently arranged. Mr. Millais' method of judging the progress of molt by the date is not satisfactory as the individual variation in plumage on a given date is very great, and few series if any will show a regular gradation if arranged chronologically.

Apart however from his explanation of some of the color changes that he describes, there is little that calls for criticism in Mr. Millais' beautiful volumes. They form a charming addition to ornithological literature and

---

[1] Stone, Witmer. *Ibis.* April, 1901, p. 464.
[2] Millais, J. G. *Ibis.* October, 1896, p. 451.
[3] Bull. Mus. Comp. Zool., XL, pp. 147–186, 1902.

a work of reference which will be in much demand but which on account of its costliness will be available to but few who have not access to the larger scientific libraries.—W. S.

Reichenow's 'Die Vögel.' [1] — The subtitle 'Handbook of Systematic Ornithology' well defines this important work. We have had numerous works on birds in which the families and some of the leading genera and species are described but which make no pretence of completeness beyond the higher groups. There are also Hand-Lists of species which are merely lists with the briefest possible statement of geographical distribution. Here, however, is a work which presents the bird life of the world in systematic order and attempts to mention all the more distinct species by name with a brief description and statement of geographic range, presented in the case of the larger genera in the form of a 'key.' There are full diagnoses of families, subfamilies and genera accompanied frequently by keys while numerous text figures and references to other works add to the utility of the text.

The author has had to use his own judgment as to how many species deserve mention under each genus, and as this is purely a matter of personal opinion, others will of course differ with him in some cases. Under *Buteo* the North American species mentioned are *borealis, swainsoni, brachyurus* and *albicaudatus*, but *lineatus* and *platypterus* are omitted. This is perhaps an oversight as such closely related forms as *Archibuteo lagopus* and *sancti-johannis* both appear.

On the whole however Dr. Reichenow has, we think, been very successful in his difficult undertaking. With the constantly increasing number of geographic races that are being named — many of them binomially — it is becoming more and more necessary, for practical purposes, to have the more obviously distinct forms picked out in some way or other, and the present attempt is therefore particularly welcome. As an indication of how complete Dr. Reichenow's treatment is I have compared the number of species mentioned by him under several families with those given in Sharpe's Hand-List. The latter, of course, includes numerous slightly differentiated subspecies which naturally have no place in a work such as 'Die Vögel.'

Platycercidæ	Reichenow	73,	Sharpe	84
Carpophagidæ	"	75	"	81
Ibididæ	"	28	"	34
Colymbidæ	"	18	"	25

In the matter of genera the author is decidedly conservative while in his nomenclature he fails to follow the International Code. We find *Vultur*

[1] **Die Vögel. Handbuch der systematischen Ornithologie von Anton Reichenow. Zwei Bände.— Erster Band, mit einer Karte und 185 Textbildern nach der Natur gezeichnet von G. Krause. Stuttgart. Verlag von Ferdinand Enke. 1913. Roy. 8vo. pp. 1–529. Price, 15 marks. The Second Volume to appear in the summer of 1914.**

retained for *V. monachus*, *Strix* for the Barn Owls, *Merganser* and *Mergus* for two different genera, *Mycteria* for the Jabiru, *Tantalus* for the Wood Ibis, etc., etc. It is unfortunate that in such an excellent work as 'Die Vögel', which could do so much towards uniformity in nomenclature, the modern system should not be adopted. The classification is also conservative and many generally accepted relationships are not admitted. The Owls still remain among the Birds of Prey, the Pigeons and Sand Grouse are separated by the Phasianidæ, while the Gulls and Shore-birds are widely separated, etc.

An introduction covering pp. 1–67 treats briefly of structure, classification, zoögeography, nomenclature etc. with a useful concordance of the names of the various parts of a bird in Latin, German, English, French and Italian.

Altogether 'Die Vögel' promises to be one of the standard works of reference on the birds of the world from the systematic standpoint, and contains more information of this kind than any other book of the same size — more probably than any other work except the 'British Museum Catalogue' or the still uncompleted 'Tierreich.'— W. S.

'Oologia Neerlandica.' [1]— The four parts of Mr. Van Pelt Lechner's work which have appeared since our last notice bring this admirable publication to completion. The unusually high standard of both plates and letter press is fully maintained and the work will take its place as one of the noteworthy publications dealing with birds' eggs — an example of what can be done in scientific oölogical investigation.

These parts deal largely with the Terns, Shore-birds, Rails, Herons, etc., and the plates are particularly handsome. Some of them are identical with, or very closely related to, American species and hence the discussion of the coloration of their eggs and the characters by which they may be distinguished are of great interest to American oölogists. Still more interesting however are the discussions of shell layers of the Falconidæ and other groups and the generic characters which their coloration furnishes, *Buteo* and *Accipiter* for instance have the first layer green and the second white, while in *Falco* both are white, the latter colored superficially. In all the *Falconidæ* there is a third thin layer of mucus which bears spots in all the genera mentioned. The author points out the errors that have resulted in making gross comparisons between the eggs of certain species, when the colorations compared arise from different shell layers and are therefore not comparable. In comparing eggs of *Coturnix* and *Perdix* the author finds that the spots on the eggs of the former are contained in a superficial layer of glutin, under which is an unspotted layer, yellowish or grayish brown in color, which corresponds with the surface layer of the *Perdix* eggs. The fun-

[1] "Oologia Neerlandica" Eggs of Birds Breeding in the Netherlands. By A. A. Van Pelt Lechner. Parts IV–VII. Jan., Aug., and Nov. 1913, and Feb., 1914.

damental layer in both cases is colored with oöcyanin. This gives some idea of the thorough study of the shell structure and coloration that Mr. Lechner has conducted, a line of investigation which has been utterly neglected by American 'oölogists' but one well worthy of pursuit if they would substantiate the claim that their large series of egg shells are collected for the benefit of 'science.' One can readily appreciate how such investigations may yield data of much phylogenetic value. We congratulate Mr. Lechner upon the character of his work and upon its progress towards completion, while the publisher deserves the highest credit for a beautiful piece of book-making.— W. S.

Phillips on African birds.— Drs. J. C. Phillips and G. M. Allen spent two months beginning December 25, 1912, on the Blue-Nile and Dinder River, in Sennar, Sudan, and obtained a collection of 340 birds, representing 150 species. A briefly annotated list of these is published by Dr. Phillips in the Bulletin of the Museum of Comparative Zoölogy,[1] with a short account of the trip. Descriptions of two new forms, *Caprimulgus eleanoræ* and *Passer domesticus chephreni* were described previously,[2] while in the present number of 'The Auk' appears an article on the author's impressions of the bird life of the Sudan and a color plate of the new Nightjar.

Dr. Phillips found the mid-winter bird-life, especially at the mountain at Fazogli, far less rich and varied than has been reported by summer visitors and evidently, as he points out, there must be considerable local seasonal movements among the resident species.— W. S.

Bunker on the Birds of Kansas.— During the years 1911 and 1912, Messrs. C. D. Bunker and T. A. Rockland made extensive explorations along the south, west and north borders of Kansas, collecting about 1700 skins in forty-one different counties. Meanwhile, Miss Arta Briggs has carefully reidentified the collection of birds in the University of Kansas Museum and brought the nomenclature up to date. Eight forms new to the state list were obtained on the field trips, while Miss Briggs has detected twenty-seven species and subspecies not contained in Prof. Snow's last edition of this 'List of the Birds of Kansas,' published in 1903. These have been incorporated in the new list of Kansas birds[3] which Mr. Bunker, assisted by Miss Briggs and Mr. Dix Teachenor, here presents and which has been brought up to date in matters of nomenclature though primarily

---

[1] Notes on a Collection of Birds from the Sudan. By John C. Phillips. Bull. Mus. Comp. Zool. Vol. LVIII, No. 1, pp.1–27. December, 1913.

[2] Two New African Birds. By John C. Phillips. Proc. Biol. Soc. Wash. Vol. XXVI, pp. 167–168. June 30, 1913.

[3] The Birds of Kansas. By C. D. Bunker, of the University of Kansas Museum. Kansas Univ. Sciences, Bull. VII, No. 5, June, 1913, pp. 137–158. An inserted slip states that "equal credit should be given to Miss Arta Briggs and Dix Teachenor for this publication."

based upon the fifth edition of Dr. Snow's list. The total number of species and subspecies is 379 as against 348 given by Dr. Snow. The Oregon Junco, Loggerhead Shrike and Long-billed Marsh Wren recorded by him are omitted as no evidence of their occurrence could be found.

It is unfortunate that the species added to Dr. Snow's catalogue are not listed separately as it is difficult or impossible to pick them out of the main list. The paper makes a convenient summary of our present knowledge of the Kansas avifauna and will be of much assistance to local students of Kansas birds.— W. S.

Swarth on Geese of the Branta canadensis Group.[1] — Mr. Swarth bases his study upon a series of 153 skins mainly from California and his conclusions go far to straighten out the confusion that has prevailed regarding the relationships of the four races of Canada Geese.

He finds that the breeding bird of California is true *canadensis* while *occidentalis* is entirely restricted to the humid northwest coast region where it is nearly resident, never migrating as far south as California. These are both large birds with the throat usually entirely white and the collar on the lower neck usually absent, the former form being light gray below, the latter dark brown.

Branta c. minima is the smallest form, with a bill notably smaller than in either of the above but presenting the greatest variation in coloration.

B. c. hutchinsi forms a perfect series of intergrades between *canadensis* and *minima*, and like the latter is very variable in color characters. The smaller races breed in the far north, *minima* on the Alaskan coast of Bering Sea and the Aleutian Islands; *hutchinsi* farther east. The numerous intergrades indicate that their breeding areas merge one into the other but the alleged breeding of *hutchinsi* in Alaska would seem to need careful confirmation. Mr. Swarth has produced a careful and valuable piece of work.— W. S.

Job on the Quest of the Canvasback.[2] — Mr. Job with three companions spent three months of the past year on Lake Winnipegosis, northern Manitoba, studying the breeding ducks and other water fowl. His main object was to secure young of the various species, especially Canvasbacks, for breeding experiments which he is carrying on in Connecticut. He succeeded, with the aid of incubators and brooders, in hatching and raising about 200 young ducks of ten species, as well as some Coots, while a few young were caught alive in the marshes. Mr. Job tells the story of his summer's experience in a most delightful way and illustrates his article

---

[1] A Study of a Collection of Geese of the *Branta canadensis* group from the San Joaquin Valley, California. By Harry S. Swarth. Univ. of Cal. Publ. in Zool., Vol. 12, No. 1, pp. 1–24, pls. 1–2. Nov. 20, 1913.

[2] In Quest of the Canvasback. By Herbert K. Job. Outing, February, 1914, pp. 515–525.

with a number of excellent photographs of the young ducks and snapshots of flocks of old birds on the wing. This is Mr. Job's second experiment in securing young wild ducks, the previous summer having been spent at Lake Manitoba when about 100 young, of the later breeding species, were obtained, although he was then too late for the Canvasbacks. The further experiments of the author in rearing these birds will be watched with interest and all bird-lovers and sportsmen will join in his hope "that they may duly multiply and help to replenish the earth in our eastern districts so woefully lacking in these splendid wild fowl." — W. S.

Mearns on Additional New Birds from Africa.[1] — Dr. Mearns' latest contribution to African ornithology consists of the description of ten new subspecies contained in the several collections recently added to the U. S. National Museum collection. These are *Pogonocichla cucullata helleri*, Mt. Mbololo; *Cossypha natalensis garguensis*, Mt. Gargues; *C. natalensis intensa*, Taveta; *Bradypterus babœculus fraterculus*, Escarpment; *Sylvietta leucophrys keniensis*, Mt. Kenia; *S. brachyura tavetensis*, Taveta; *Zosterops senegalensis fricki*, Thika River; and *Z. virens garguensis*, Mt. Gargues, all in British East Africa; while from Abyssinia are described *Sylvietta whytii abayensis*, Gardulla; and *Melamparus afer fricki*, Dire Daoua.— W. S.

Grinnell's 'Second List of Birds of the Berkeley Campus.'[2]— Intensive studies like the present are always interesting especially to those interested in keeping records of bird migration and fluctuation from day to day. After all, the list of birds from the farm, the college campus, or the city yard is only the county or state list on a small scale.

The campus of the University of California comprises 530 acres and is fortunate in including some truly wild land and considerable diversity of environment. Mr. Grinnell's list now numbers 97 species, while the mean population in individuals is approximately 8,000. The usual number of species seen per day is remarkably constant as shown by the following: July 3, 29 species; February 11, 26; March 25, 22; January 20, 20; October 18, 27.—W. S.

Baker's 'Indian Pigeons and Doves.'[3] — This is another sumptuous work similar in all respects to the same author's 'Indian Ducks.' The

---

[1] Descriptions of Ten New African Birds of the Genera Pogonocichla, Cossypha, Bradypterus, Sylvritta, Melaniparus and Zosterops. By Edgar A. Mearns. Smithson. Misc. Collns., Vol. 61, Number 20, pp. 1–8. Nov. 29, 1913.

[2] A Second List of the Birds of the Berkeley Campus. The Condor, XX. January, 1914, pp. 28–40.

[3] Indian Pigeons | and | Doves | By | E. C. Stuart Baker | F. Z. S., F. L. S., M. B. O. U.| Author of "Indian Ducks and their Allies" | with twenty-seven coloured plates from drawings by | H. Grönvold and G. E. Lodge | Witherby & Co.| 326 High Holborn, London | 1913. roy. 8vo. pp. i–xv + 1–260, 26 plates. £2 10s. net.

text is printed on a heavy rag paper while the plates are beautiful reproductions in color of the paintings of Messrs. Grönvold and Lodge. The general plan of treatment consists of keys to the genera and species, synonymy and vernacular names of each species, full description of male, female and young, distribution, nidification, general habits, and consideration of the species as a game bird. Fifty-one species and subspecies are treated, of which twenty-six are figured on the plates. The pigeons of India present a great diversity of coloration, startling to one familiar only with the few dull plumaged species to be found in North America. There are fifteen different species of Green Fruit Pigeons (*Treroninæ*), five species of the large green and gray Imperial Pigeons and one nearly pure white (*Carpophaginæ*), the wonderful bronze green Nicobar Pigeon (*Calænadinæ*), the Emerald Dove (*Phæbidæ*), eleven True Pigeons (*Columbinæ*), sixteen Ring Doves, Turtle Doves, etc. (*Columbinæ*) and the Indian Ground Dove (*Geopeliinæ*).

The accounts are full and complete, and often furnish entertaining reading matter while the excellent descriptions, synonymy and beautiful plates make the work important as a reference volume, and a magnificent addition to any library of ornithological books. The nomenclature is thoroughly up to date.— W. S.

Menegaux's Reprint of the Ornithology of the Echo du Monde Savant.[1] — The 'Echo du Monde Savant' is one of the rarest and least known of scientific periodicals. It was published in Paris from 1834 to 1846, but only a few complete files are preserved even there, while in America we know only of two incomplete sets, both in Washington — one in the Patent Office Library and the other in that of the Department of Agriculture.

The chief writer of ornithological articles was R. P. Lesson, who contributed from 1842 to 1845, while in 1836–7, I. Geoffroy St. Hilaire published a 'Cours d'Ornithologie.'

In Lesson's articles occur many new generic and specific names and it is the frequent need of consulting these in present day systematic ornithological work, that makes a reprint such as Prof. Menegaux has undertaken most welcome.

The reprint is well printed on good paper and is apparently carefully prepared in point of accuracy of transcription. It is therefore particularly unfortunate to find that it is not a complete collection of Lesson's publica-

[1] Articles | d'Ornithologie | de | R. P. Lesson | Médecin, Pharmacien en Chef de la Marine | Professeur a l'École de Médecine navale de Rochefort | Parus dans l'*Écho du Monde Savant* | de 1842 á 1845. | Reimpression faite par les soins | de | A. Menegaux | Professeur agrégé de l'Université, | Assistand d'Ornithologie | av Muséum d'Histoire Naturelle de Paris | Paris | Edition de la *Revue Francaise d'Ornithologie.* | 55, rue de Buffon, 55 | En vente à Munich | Chez MM. Dultz et Co, Libraires | 6, Landwehrstrasse, 6 | 1913. 8vo. pp. 1–282. With frontispiece portrait of Lesson. 10s. net. to subscribers.

tions in the 'Echo.' It would seem that Prof. Menegaux entirely overlooked a series of papers entitled 'Index Ornithologique', until the reprint was completed. He then published two numbers of the series on a supplementary leaf, pp. 281–282. A number of new generic names proposed in the other numbers do not, however, appear at all in the reprint. Such are, in 1842: *Gymnogyps* col. 1037, *Setogyps*, *Sarcogyps*, and *Trigonoceps*, col. 1038; in 1843; *Ichthyophaga*, col. 14, *Chondrohierax*, col. 61, *Chelictinia*, col. 63, *Cunistrix*, col. 540 and *Cyphorhina*, col. 1068. These are all to be found in the lists of genera published by Waterhouse or Richmond, which makes their omission the more remarkable. It is to be hoped that a supplement may be prepared containing all the articles omitted from the present reprint along with an alphabetical index to all the new genera and species proposed by Lesson in the 'Echo' which would materially aid the systematist who desires to consult the work.— W. S.

Mathews' 'The Birds of Australia.'[1] — The latest part of Mr Mathews work completes the shore-birds and cranes and begins the ibises. The same thoroughness of treatment and detailed discussion of matters of nomenclature which have marked the previous parts are maintained but the author's exhaustive studies in connection with the preparation of his recent 'List of Australian Birds,' have so nearly completed the systematic side of the subject that one finds scarcely any new names proposed in this number. A new genus *Subglareola* with *Glareola ocularis* as its type is the only one that we note.— W. S.

The South Australian Ornithologist.[2] — The activity of ornithological study in Australia is evidenced by the appearance of another journal devoted to the subject. Whether this is to be a quarterly or monthly we are not informed, nor is there any indication as to where it is published or how it may be obtained. The editorial committee however, with one exception, are founders of the 'South Australian Ornithological Association' organized in 1899 at the South Australian Institute and Museum.

In glancing over the pages of the new journal we note that it adopts the principles of nomenclature set forth in the International Code and elaborated for Australian birds by Mr. Gregory M. Mathews but which are rejected — we hope only temporarily — by the Royal Australasian Ornithologists' Union and 'The Emu.' The 'South Australian Ornithologist' thus places itself in line with the leading journals of other countries. The papers in the initial number comprise: 'A History of Ornithology in South Australia,' by R. Crompton; 'The Avifauna of Melville Island, Northern Territory,' by F. R. Zietz, in which we note nine new subspecies. There are also; an account of *Rhipidura tricolor;* a description of *Halcyon*

[1] The Birds of Australia. Vol. III, Part 4. December 31, 1913.

[2] The South Australian Ornithologist. Vol. I, No. 1. January 1914. Editorial Committee: F. R. Zietz, (President), A. M. Morgan, S. A. White, R. Crompton.

macleayii cæruleus subsp. n. by Edwin Ashby; and several notes. We congratulate the Editors of the new journal upon the appearance of the first issue and hope it may have a successful career.— W. S.

Mullens' 'Guide to Selborne.'[1] — This little brochure intended originally for the anniversary trip of the British Ornithologists' Club is admirably adapted for the use of any visitor to the historic residence of Gilbert White. The points of interest are mentioned and described just as the visitor would approach them, and one who is familiar with the 'Natural History of Selborne' gets a much clearer idea of the relative position of the various buildings, trees, etc., by reading this guide even if he be not fortunate enough to be a visitor. The appended synopsis of Gilbert White's life is an interesting biography and an accurate character sketch of the naturalist.

In this connection we might call attention to another delightful contribution to the same subject which although published some years ago may not be familiar to the readers of 'The Auk', this is 'A Selborne Pilgrimage,' by Dr. Cornelius Weygandt, an associate of the American Ornithologists' Union, which appeared in 'The Atlantic Monthly' for August, 1905.— W. S.

Sarasin on the Birds of New Caledonia.[2] — The first part of the zoölogy of Sarasin and Roux's 'Nova Caledonia' consists of the account of the birds of New Caledonia and the Loyalty Islands by Dr. Fritz Sarasin. Eighty-seven species are listed, together with several subspecies, and a comparative list of the birds of the two island groups is added as well as a list of nine species from the New Hebrides and a good bibliography of 84 titles.

In the main list the following are described as new: *Pseudogerygone flavilateralis lifuensis*, Lifou; *P. rouxi*, Ouvea; *Myiagra caledonica uveaensis*, Ouvea; *M. c. mareensis*, Mare; *Diaphoropterus nævius simillimus*, all three Loyalty Isls.; *Zosterops lateralis nigrescens*, Mare and Ouvea; *Merula mareensis larochensis*, Mare; *Aplonis atronitens minor*, Lifou and Ouvea; *Columba hypænochroa uveaensis*, Ouvea; *Porphyrio calvus caledonicus*, New Caledonia.

As imported birds are listed, *Acridotheres tristis*, *Estrilda astrilda* and *Passer domesticus*. Three plates illustrate this important paper.— W. S.

Hellmayr on the Avifauna of Timor.[3] — This excellent paper covers all the birds known from the island which comprise 140 species. Among

[1] Guide to Selborne and Synopsis of the Life of Gilbert White. By W. H. Mullens. Bull. of the British Ornithologists' Club, CXC. pp. 1–27. Witherby & Co. 1913. Price 2s. 6d. net.

[2] Die Vögel Neu-Caledoniens und der Loyalty-Inseln. von Dr. Fritz Sarasin. Nova Caledonia, Zoologie, Band I, Heft I. Mit 3 Tafeln in Lithographie und 6 Abbildungen im Text. Wiesbaden. C. W. Kreidels. Verlag. 1913.

[3] Zoologie von Timor. Ergebnisse der unter Leitung von Joh: Wanner im Jahre. 1911 ausgeführten Timor-Expedition Herausgegeben von C. B. Haniel I Lieferung. Die Avifauna von Timor von C. E. Hellmayr. Mit einer Farbentafel. January 10, 1914. 4°. pp. 1–112.

these or in the discussions on their relationship we note the following new forms proposed: *Pachycephala orpheus wetterensis*, Wetter Isl.; *Philemon timoriensis pallidiceps*, Wetter Isl.; *Halcyon australasia tringorum*, Roma Isl.; *Trichoglossus hæmatodus flavotectus*, Wetter and Roma; *Falco longipennis hanieli* Bonleo, West Timor. The plate illustrates *Dicæum hanieli* and *Planesticus fumidus schlegelii*.— W. S.

Elms' 'A Pocket-Book of British Birds' [1] **and other 'Handbooks.'** — This little volume, truly a 'pocket edition,' contains more information on British birds in a compact form than any book with which we are acquainted and would seem to be just the thing for American bird students who visit England and desire to become acquainted with some of the native birds. The information is arranged under clearly indicated headings: haunts, observation, plumage, language, habits, food, nest site, materials, eggs, etc. Messrs. West Newman & Co. have also published a somewhat similar though far less complete book on 'Familiar Indian Birds' [2] by Gordon Dalgliesh and a larger work on 'Practical Bird-keeping' [3] consisting of reprinted articles from the Avicultural Magazine of 1911–12. This work brings under one cover a vast amount of data concerning the breeding and keeping of wild birds of all sorts, a pastime more widely practiced in England than in America but with many devotees on both sides of the Atlantic.— W. S.

Miss Keezel's 'Bird Study Note Book.' [4] — This is a copy book, six and a quarter by eight and a quarter inches, with columns for recording the name, date of arrival, coloration, etc., of each species of bird observed. It will doubtless be helpful to teachers conducting a children's bird class, although many of them will doubtless prefer to use perfectly blank books and rule them according to their own ideas.— W. S.

Shufeldt, on Extinct Ostrich Birds of the United States. [5] — A discussion of the relationships of the fossil avian genus *Diatryma*, with numerous quotations form various authorities. The author regards the genus as more nearly related to *Struthio* than to the Gastornithidæ where it has been placed by some writers.— W. S.

---

[1] A Pocket-Book of British Birds. By E. F. M. Elms. London, 1906. West, Newman & Co., 54 Hatton Garden. Small 8vo. pp. 1–150. 1906. 2s. 6d.

[2] Familiar Indian Birds. By Gordon Dalgliesh. 8vo. pp. 1–90. West, Newman & Co. London. 1909.

[3] Practical Bird-Keeping. Edited by J. Lewis Bonhote. West, Newman & Co. London. 1913.

[4] Bird Study Note Book for Intermediate and Grammar School Grades. By Clara Cozad Keezel. Single copies, 27 cents, postpaid. Discount for Quantities. Garnet, Kansas.

[5] Extinct Ostrich Birds of the United States. By Dr. R. W. Shufeldt. Aquila, 1913, pp. 411–422, pll. I–V. (In Hungarian and English).

Valuable Economic Reports.— Mr. E. H. Forbush, State Ornithologist of Massachusetts, in his annual report[1] discusses a number of interesting topics. The feeding and attracting of wild birds are discussed, and also the apparent poisoning of birds by the excessive spraying of trees. The Starling has reached several stations in Massachusetts and additional evidence of its driving away native birds and taking possession of Flickers' nests is presented. There is also an extended discussion as to the damage done by Reedbirds to the rice crop of the South Atlantic States and the shooting of the birds for market rather than as a protection to the rice. The rice industry has for the most part moved westward to Louisiana and the marketing of Reedbirds in South Carolina has greatly decreased in recent years.

Mr. W. L. Finley continues his reports as State Game-warden of Oregon, in a series of monthly bulletins under title of 'The Oregon Sportsman,'[2] while an exceedingly attractive brochure with many illustrations describes the good work that he has accomplished during 1911–1912.[3]

Bird Enemies of the Philippine Locust.[4]— A report on this subject by D. B. Mackie which we wish were more definite and detailed is nevertheless worth quoting because of the high rank it assigns to the bird enemies of this notable pest.

"Birds — There are no natural enemies which attack the locust so persistently in all stages as birds. They often congregate where the locust swarms are and remain for days or weeks at the swarm eating their fill as often as they desire. Their importance as locust exterminators cannot be too strongly emphasized. Unfortunately, many of our most persistent locust feeders are not wary in their habits and are ruthlessly snared whenever chance offers. Investigations of the value of birds as locust feeders are limited to cases where individuals have been taken and their stomach contents examined.

"Twenty-four species of locust-eating birds have been identified, in the following families:

Turnicidæ (1)	Alcedinidæ (4)
Coraciidæ (1)	Corvidæ (1)
Ardeidæ (2)	Sylviidæ (2)
Falconidæ (3)	Fringillidæ (2)
Artamidæ (1)	Anatidæ (2)
Phasianidæ (2)	Cuculidæ (1)
Meropidæ (2)	

[1] Fifth Annual Report of the State Ornithologist of the Massachusetts State Board of Agriculture. By Edward Howe Forbush. 1912. January 8, 1913. pp. 1–34.

[2] The Oregon Sportsman. Vol. I, Nos. 1–4.

[3] Game and Fish Protection and Propagation in Oregon, 1911–1912. By William L. Finley, State Game Warden. pp. 1–23.

[4] Mackie, D. B., Philippine Agr. Review, VI, No. 11, Nov., 1913, p. 541.

"These species represent only a small number of the birds which have been observed but not taken for identification." — W. L. M.

Report on Introduced Pheasants in Massachusetts.[1]— There has recently been printed as Document No. 2049 of the Massachusetts House of Representatives, a valuable summary of the history of introduced pheasants within the state. Originally introduced in 1896, from 100 to 2500 have been liberated annually by the Game Commissioners, and the bird is now fairly common. The report touches upon the use of pheasants as game in other countries and other parts of the United States. Details are given of the life history, and methods adopted in rearing the birds. The special adaptability of pheasants to artificial propagation is the prime reason for their extensive distribution.

An open season on pheasants was allowed during only one year since their introduction. The birds increased and reports of damage began to come in. The Commission says: "During the past two years numerous complaints have been made relative to damage to farm crops. Many verbal complaints have been received of which we have no record. Of the formal reports which have been filed at this office, 21 persons complained of damage to corn, 15 to garden truck, 3 to peas, 2 to tomatoes, 2 to fruit, 1 to potatoes. In many instances the potential value of the crop partially or wholly destroyed reaches several hundred dollars, instances being cited where three entire plantings of early sweet corn were pulled up. In some cases fictitious claims have been made, where the damage attributed to the pheasants was done by domestic fowl and by crows. There is no question that in certain localities where the pheasants have increased abnormally very great damage may result unless an effective check is applied, and while in many instances real damage has been done to crops, we have many unsolicited testimonials to the fact that pheasants, though numerous, have never done appreciable damage."

Examination by the Biological Survey of stomachs collected at localities where damage to crops was attributed to the birds, resulted in the following showing: 37 percent of the food counts in the bird's favor; 27 percent is adverse, and the remainder practically neutral. Many notes on pheasant food based on field observations and on a few other stomach analyses are included.

The most interesting part of the pheasant report comprises the able recommendations regarding public policy in relation to the bird. "Apart from the insect-eating capacity of the bird, it has a high food value as a table bird. The present market price is $2.50 to $3 a pair, and many thousand dollars' worth of pheasants are imported annually.

"It would be logical, therefore to increase as much as possible the number

[1] Special Report of the Massachusetts Board of Commissioners on Fisheries and Game, relative to the Habits of those birds commonly known as Pheasants. Doc. 2049 Mass. House of Representatives, 1914.

of birds raised in Massachusetts, feed them upon the insects for the suppression of which the public is spending annually at least a million dollars, and each autumn kill the surplus old birds for food." Admitting that damage is caused in some cases, the Commissioners continue: "Thus, while the individual farmer may have actually been damaged in a very substantial way, the community has been benefited by the insect-eating value of the pheasant, and the State should reimburse the farmer for damage to his crops in cases where substantial damage could be shown; or, in case of persistent damage, provision should be made for killing the individual pheasants which have thus acquired the perverted habit of eating as special food farm products of particular value to man."

This is a clear convincing statement of a necessary corollary to the theory of state ownership of wild game. Massachusetts has advanced further than any other state in the practical working out of game protection under this theory. For years it has reimbursed cultivators for losses occasioned by deer, and it now proposes to apply the same method to the pheasant problem. As a matter of fact the principle set forth must be applied to all wild animals protected by the state. If citizens are unable legally to protect their property then they must in justice be paid by the state when they suffer loss on account of animals which are the property of the state.

The reviewer has hitherto argued for exemptions in state protective laws in favor of owners whose property was being damaged The Massachusetts plan is however more logical, more in accord with modern ideas as to strict and comprehensive protection, and is simpler in operation. In Massachusetts, reports of damage are now investigated jointly by a representative of the game commission, and one of the state board of agriculture in coöperation with the complainant. The damage is assessed, and the amount paid. Thus the matter is definitely settled in one transaction. Permission to kill injurious animals, for a few days or a season, would involve long drawn out and expensive inspection and seems not nearly so practicable a scheme as the Massachusetts plan. We must do something to satisfy complainants or our protective laws will create antagonists instead of supporters. Massachusetts is doing this in a sane and logical way and other states would do well to follow her example.

A contingency beyond remedy by the process outlined above, is damage caused by the increase or incursion of overwhelming numbers of any species. Such an emergency could be met by declaring suitable open seasons, and by instituting coöperative destructive measures.— W. L. M.

The Ornithological Journals.[1]

Bird Lore. Vol. XVI. No. 1. January–February, 1914.

Impressions of the Voices of Tropical Birds. By L. A. Fuertes. Second paper — Tinamous, Partridges and Solitaires.— These delightful papers illustrated by bird portraits drawn in the author's well known style, give one a more vivid idea of neotropical bird life than anything that has appeared for a long time.

Notes on How to Start a Colony of Purple Martins. By T. L. McConnell.

Winter Feeding. By W. L. Skinner.

City Nighthawks. By C. G. Abbott.— Breeding on a house roof in Brooklyn.

Migration of N. A. Sparrows. (Red-polls and Purple Finches.) By W. W. Cooke.— Plumages by F. M. Chapman, color plate by L. A. Fuertes.

Bird Lore's Fourteenth Christmas Census — 179 lists are published, while many others were for one reason or another rejected. This illustrates the almost unwieldly proportions to which these returns have grown. Mr. E. H. Perkins contributes a consideration of the variation in abundance of a number of winter species based on the Christmas-day lists from 1901 to 1911 and the editor contributes 'Notes on Winter Birds' and proposes a 'Coöperative Study of Migration' selecting the Red-winged Blackbird, Robin and Phœbe as the first three species for study. The Wood Thrush. By T. G. Pearson with color plate by L. A. Fuertes is the Educational Leaflet.

The Condor.—Vol. XV. No. 6. November–December, 1913. Henry B. Kaeding. By Joseph Mailliard.

Notes on the Eggs of the North American Limicolæ. Referring principally to the Accidental Visitors. By H. Massey.

Some Further Notes on Sierran Field-work. By M. S. Ray.— Mainly near Pyramid Peak.

Identification by Camera. By W. L. Dawson.— Two photographs of Yellow-legs, Northern Phalarope, etc.

Some Curious Nesting Places of the Allen Hummingbird on the Rancho san Geronimo. By Joseph Mailliard.— On hanging rope loops, etc.

The Birds of San Martin Island, Lower California. By H. W. Wright.— With numerous illustrations.

A Mnemonic Device for Color-workers. By W. L. Dawson.— This is followed by a 'partial critique,' which deals with the nomenclature of colors adopted by Mr. Ridgway, the claim being made that 'Payne's Gray' for instance, is meaningless as a name. The author seems to think that a

[1] The names of the editor and publisher of each journal will be found in the January number of 'The Auk.'

nomenclature *can* be devised which will recall a given color. This we very much doubt and it seems to us a case exactly parallel to that of syllabic notation of bird song (cf. Auk, 1913, p. 472). There may be some people endowed with a color sense similar to the gift of absolute pitch in music, who can tell the relationship of a given shade to one of the primary tints, but they must be exceedingly rare, and if we have to match our colors with the book it is easier by far to locate 'Payne's Gray' by the index than to find " the double-gray half-tint of spectrum blue " according to the system tentatively suggested by the author, and imagine the consternation of the modern describers of new races of birds who glory in reducing their descriptions to two or three lines if they had to use such a nomenclature! Mr. Ridgway's names are simply intended as 'check-marks' by which the colors described by one author may be found by another. Numbers would have been simpler but the danger of ruinous typographical errors would have been very great.

Preliminary Report upon the Disease Occurring among the Ducks of the Southern San Joaquin Valley during the Fall of 1913. By Frank C. Clarke.— Estimated that 25,000 birds had perished at the time the investigation was made. Examinations and experiments show either a mineral or organic poison in the water as the cause of the disease.

The Condor. Vol. XVI. No. 1. January–February, 1914.

Direct Approach as a Method in Bird Photography. By W. L. Dawson. — Illustrated by some remarkable photographs of shore birds, ibises, etc.

Notes on the Derby Flycatcher. By Adriaan Van Rossem.— In Salvador.

Some Notes on the Nesting of the Sharp-shinned Hawk. By H. J. Rust.— Admirable photographs show the development of the young.

The People's Bread. By W. L. Dawson.— A critique of 'Western Bird Guide.'

A Second List of the Birds of the Berkeley Campus. By Joseph Grinnell.

The Wilson Bulletin. Vol. XXV. No. 4. December, 1913.

Experiments in Feeding Hummingbirds during Seven Summers. By Althea R. Sherman.— A most valuable contribution to the habits of the Ruby-throated Hummingbird. Bottles of syrup eventually attracted almost the entire attention of the birds to the exclusion of flowers. Artificial flowers attached to the tops of the bottles were found quite unnecessary, the birds drinking as readily from the exposed bottles. Six hummingbirds consumed in twenty days three cupfuls (9252 grains) of sugar made into syrup. The detailed observations are extremely interesting.

Nest Life of the Catbird. By I. N. Gabrielson.— A detailed study of the feeding of the young, etc., similar to the author's previous paper on the Brown Thrasher.

Bird Notes from the South West. By J. L. Sloanaker.— Near Tucson, Arizona.

An Unusual Flight of Warblers in the Missouri Valley. By T. C. Stephens.— Annotated list of 19 species observed at Sioux City, Iowa, during the spring of 1913.

The Oölogist. Vol. XXX. No. 12. December 15, 1913.

Two Months in the Everglades. By O. E. Baynard.

Preliminary List of Water Birds of the Middle Delaware Valley, A Correction. By R. F. Miller.— Records queried in these columns are admitted to be without foundation and the list "purposely written to excite the professional ornithologists to adverse criticism"! 'The Oölogist' can hardly afford to publish such articles.

The Oölogist. Vol. XXXI. No. 1. January 15, 1914.

Bachman's Sparrow, A Summer Resident in Southern Pennsylvania. By S. S. Dickey.— Several birds found and watched in the extreme southwestern corner of Pennsylvania. Unfortunately they were not positively identified.

The Oölogist. Vol. XXXI. No. 2. February 15, 1914.

Nesting of the Northern Raven in Pennsylvania. By S. S. Dickey.

The Ibis. X Series. Vol. II. No. 1. January, 1914.

Notes on the Nidification of some Birds from Burma. By H. H. Harrington.— On some 40 species the nesting of which is not mentioned in Hume's 'Nests and Eggs.' A colored plate contains figures of many of the eggs.

Notes on Birds observed in Katanga, Belgian Congo. By L. Beresford Mouritz.

An Ornithological Expedition to the Eastern Canary Islands. By David A. Bannerman.— The first installment of this extended report on the results of Mr. Bannerman's expedition, May–June, 1913, to the islands of Fuerteventura, Lanzarote, Allegranza, Graciosa and Montaña Clara. Excellent views of the scenery and color plates of *Hæmatopus niger meadewaldoi* and *Saxicola dacotiæ murielæ* are given.

A List of the Birds of Melville Island, Northern Territory, Australia. By Gregory M. Mathews.— An Annotated list of 167 species, observed apparently on an expedition undertaken in 1911–12, although there is no statement on this point or as to who collected the specimens and made the field notes!

Obituaries.— Alfred Russell Wallace, Richard John Ussher, William John Ansorge, Ora Willis Knight and Anton Fritsch.

Bulletin of the British Ornithologists' Club. No. CXCII. November 27, 1913.

Chairman's address on the progress of ornithology.

Mr. Bannerman described his trip to the Canaries.

H. H. Harrington described as new *Proparus ripponi*, Burma; *Stachyris nigriceps coltarti*, Margherita; *Ixulus flavicollis harterti*, Burma; *Siva cyanuroptera oatsi*, Byingyi Mt.; *Alcippe fratercula yunnanensis*, Mts. of Yunnan.

W. R. Ogilvie-Grant called attention to the fact that young starlings from the Shetland and Orkney Islands were sooty black instead of brown. He also exhibited *Clangula islandica* from Iceland in eclipse plumage.

Hon. W. Rothschild discussed the genus *Bradyornis*, describing as new *B. pallidus sharpei* from Abyssinia (= *B. pallida* auct. nec Müller). He also described *Casuarius foersteri* sp. n., S. E. New Guinea.

W. P. Pycraft summarized his investigations on the possibility of color change in feathers. He did not believe such change possible and pointed out its inherent difficulties as well as the weakness of the supposed evidence in its favor. His views were endorsed by all who discussed the question. He further contended that the eclipse plumage was not protective but was a misplaced winter plumage. This view was opposed by Mr. Rothschild who regarded it as a case of Müllerian mimicry for the protection of the female when looking after her brood.

Bulletin of the British Ornithologists' Club. No. CXCIII. December 23, 1913.

Hon. W. Rothschild exhibited some immature birds, with feathers similar to those of the adult in pattern but with more or less of the color of the young. These further illustrated Mr. Pycraft's theory that such feathers replaced others which had been accidentally lost just before the regular molt and while they anticipated the molt so far as pattern was concerned they absorbed some of the immature pigment which was still present.

E. Hartert described as new *Icterus xanthornus trinitatis*, Trinidad; *Euphonia fulvicrissa omissa*, Colombia; *E. elegantissima vincens*, Costa Rica; *Tangara aurulenta goodsoni*, W. Ecuador; *Fringilla cœlebs ombriosa*, Island of Hierro (Ferro).

C. Chubb described two new forms of Rheas, *Pterocnemia tarapacensis*, Tarapaca, and *P. t. garleppi*, Bolivia; and pointed out the differences between this genus and *Rhea*.

H. H. Harington described three new birds, *Pellorneum ruficeps granti*, Travancore; *Pterythius xanthochloris occidentalis*, N. W. Himalaya; and *P. pallidus hybrida*, Chin Hills.

W. R. Ogilvie-Grant exhibited a specimen of *Porzana carolina* shot in the Hebrides, Nov. 12, 1913.

E. C. Stuart Baker, exhibited and described the female of *Ithagenis cruentus kuseri* Beebe.

Bulletin of the British Ornithologists' Club. No. CXCIV. January 29, 1914.

The following new birds were described: By E. Hartert, *Milvus milvus fasciicauda*, Cape Verde Isls. By W. R. Ogilvie-Grant, *Lanius yemenensis*, Yemen. By H. H. Harrington, *Trochalopterum erythrocephalum godwini*, N. Cachar Hills. By S. Clarke, *Salpornis salvadorii occidentalis*, N. Nigeria. By C. Chubb, *Nothocercus salvadorii* Ecuador.

British Birds. Vol. VII. No. 7. December 1, 1913.

Richard John Ussher, A Memoir. By R. M. Barrington.

Breeding of the Roseate Tern in Ireland. By G. R. Humphreys.

The "British Birds" Marking Scheme. By H. F. Witherby.— In 1913, 14,843 birds were 'ringed' making a total of 46,823 in five years. The percentage of 'recoveries' up to 1913, was 3.3 per cent, or 971 out of 31,980. The total number of species 'ringed' is 143 of which 31 were water birds, the largest percentages of recoveries were from Mallards and Woodcock, 50 out of 222 and 15 out of 141 respectively.

British Birds. Vol. VII. No. 8. January 1, 1914.

On the Breeding-habits of the Dartford Warbler. By P. F. Bunyard.

The Dusky Warbler in Orkney. A New British Bird.

Several notes on habits of the Cuckoo.

British Birds. Vol. VII. No. 9. February 2, 1914.

Erythrism in the Eggs of British Birds. By Rev. F. C. R. Jourdain and C. Borrer.

The Avicultural Magazine. Vol. V. No. 1. November, 1913.

The Red-headed Titmouse. By H. D. Astley.— Colored plate of *Ægithalisus erythrocephalus*.

The Priceless Value of the Live Bird. By Reginald Phillipps.

Birds of Paradise in the West Indies. By C. Ingram.— Sir Wm. Ingram purchased Little Tobago Island and liberated there 44 Greater Birds of Paradise in September, 1909, and three more in 1910 and 1912, all of these were in the brown immature plumage in which the sexes are indistinguishable. It was feared that most of the first lot were males, consequently the three specimens supposed to be females were liberated later. A visit in January, 1913, and reports from the guardian, indicate that the colony is holding its own, and that the males have assumed the distinctive coloring of the head, but not the side plumes. The reported breeding of a pair has not been satisfactorily verified.

The Oyster-Catcher. By H. Willford.— Photographs of the brooding bird.

The Avicultural Magazine. Vol. V. No. 2. December, 1913.

Hornbills. By G. Renshaw.— Photographs of *Bucorax cafer* and *Sphagolobus atratus*.

Wild Ducks from an Incubator. By H. K. Job.— Reprinted from 'Outing' (continued in January Number).

Bird Notes from Port Sudan. By Mrs. N. E. Waterfield.

The Avicultural Magazine. Vol. V. No. 3. January, 1914.

My Sunbirds' Aviary. By a Lover of Birds in France.— Colored plate of *Ethopyga seheriæ*.

The Avicultural Magazine. Vol. V. No. 4. February, 1914.

The Sun Bittern. By D. Seth-Smith.— Plate of the bird in display; from painting.

Foreign Doves at Liberty. By Marquis of Tavistosh.— Successful establishment of several species on his estate.

A Few Bird Notes from Southern Provence. By Lady Wm. Cecil.

Bird Notes. Vol. IV (N. S.). No. 10. October, 1913.

Visits to Members' Aviaries. By W. T. Page (continued in November). — Interesting descriptions and photographic illustrations.

Bird Notes. Vol. IV (N. S.). No. 11. November, 1913.

A Day on the Farnes in August. By F. Dawson-Smith.

Bird Notes. Vol. IV (N. S.). No. 12. December, 1913.

Breeding of Turtle Dove Hybrids. By E. Sprankling.— *Turtur turtur* × *T. risorius* hybrids are fertile.

The Austral Avian Record.— Vol. II. No. 4. December 29, 1913.

New Species and Subspecies of Australian Birds. By G. M. Mathews.— Twenty-four species and subspecies and two new genera.

The Emu. XIII. Part 3. January, 1914.

This number is taken up largely with the account of the thirteenth meeting of the Royal Australasian Ornithologists' Union, held at Adelaide, November 23–25, 1913, at which Mr. A. H. E. Mattingley was elected president. The field trips in connection with the meeting are of particular interest, especially the trip up the Murray with views of the Cockatoo Cliffs and the White Cockatoo at the entrance to its nesting burrow. In the proceedings we are gratified to note the unanimous passage of a motion by Capt. S. A. White to recommend the use of trinomials in 'The Emu' for all subspecies. We have felt certain that on sober second thought Australian ornithologists would come into line with the rest of the world in matters of nomenclature and this is a move in the right direction. Other papers are:

Notes on Some North Queensland Birds. By W. Macgillivray — An extensive annotated list.

Descriptions of Two New Eggs. By H. L. White.

New Subspecies of Honey-eater. By H. L. White.—*Entomophila borealis* a subspecies of *E. picata* but published as a binomial.

New Parrot for Australia and Description of Eggs. By W. Macgillivray.— *Eclectus pectoralis*, a Papuan species.

Search for *Amytornis woodwardi* in the Northern Territory. By H. G. Barnard.

Ornithologische Monatsberichte. Vol. 21. No. 10. October, 1913.

Phyllastrephus chlorigula schusteri Reichenow n. sp., Nguruge Mountain, German East Africa.

The Swimming of the Dipper. By H. Geyr von Schweppenburg.

Ornithologische Monatsberichte. Vol. 21. No. 11. November, 1913.

On the generic names *Hirundo* and *Strix* and on *Totanus ochropus*. By A. Reichenow.— Opposes any change in these names or their application.

Ornithologische Monatsberichte. Vol. 21. No. 12. December, 1913.

Remarks on the Temperament of Hybrid Canaries. By Fritz Braun.

Fringilla cælebs solomkoi n. subsp. By M. Menzbier and P. Suschkin.— From Krim and the western Caucasus.

Cannibalism in Captive Young Gulls. By Hialmar Rendahl.

Cisticola cisticola jordansi subsp. nov. By Ed. P. Tratz.— From Oporto, Portugal.

Ornithologische Monatsberichte, Vol. 22. No. 1. January, 1914.

Call Notes and Song of *Pratincola torquata rubicola*. By C. Schmitt and H. Stadler.

Garrulus glandarius iphigenia n. subsp. By P. Suschkin and E. Ptuschenko.— From Koreis, S. Coast of Krim.

Alca impennis taken in the year 1848 in Norway? By H. Grote.— Quotation from Nilsson's Skand. Fauna. 1858.

Ægotheles bennetti wiedenfeldi subsp. nov. By A. Laubmann, Dutch New Guinea.

New African Species and Subspecies. By O. Neumann. *Lobivanellus senegallus major*, Mts. of N. E. Africa; *Criniger swainsoni*, 'Sierra Leone' probably = Gambia or Senegal, *Bleda syndactyla ogowensis*, Umpokosa, Lower Guinea; *Xenocichla flavicollis soror*, Congo to N. Cameroons; *Bradypterus sjöstedti*, Meru and Kilima Njaro; *B. alfredi albicrissalis*, E. Ruenzori; *B. cinnamomeus pallidior*, Mts. west of Tanganyka; *Apalis griseiceps uluguru*, Uluguru Mts.; *Thamnolæa cinnamomeiventris usambaræ*, Usambara Mts.

A New Metallic Starling. By E. Hartert and O. Neumann.— *Lamprocolius sycobius nordmanni*, Mossamedes.

Journal für Ornithologie. Vol. 62. No. 1. January, 1914.

The Avifauna of the Southeastern Part of the State of South Australia. By E. Eylmann.— Description of a trip made in 1912–13, with an annotated list (to be continued).

On some African Horned Owls. By O. Neumann.— Nomenclature of the species.

The Biology of the Little Bittern (*Ardetta minuta*). By F. von Lucanus. — With seven illustrations.

Between Migration and Breeding-time on the Meander, (continued). By H. Weigold.

The Jay of the Tyrrian Islands, with Remarks on Some Nearly Related Forms. By A. Laubmann.— *Garrulus glandarius corsicanus* and *G. g. ichnusæ*, etc.

On "*Calamoherpe Brehmii* Müller." By H. Schalow.— Colored plate.

An Ornithological Travel-picture in North Algeria. By O. Graf Zedlitz. — Followed by a list of nidological observations made on the trip.

Supposed Uniques of the Philadelphia and Vienna Museums, and their Systematic Position. By O. Neumann. '*Parisoma olivascens* Cassin' = *Alseonax olivascens* (Cassin); '*Hypodes cinerea* Cassin' = *Muscicapa cassini* Heine = *M. lugens* Hartl and should stand as *Alseonax cinereus* (Cassin);[1] '*Eremonula hypoxantha* Pelz.' = the female of *Nectarinia platura* Vieill.

Proceedings of the German Ornithological Society at the Annual Meeting held at Dresden, October 4–6, 1913.

Ornithologische Monatsschrift. Vol. 38. No. 11. November, 1913.

Noteworthy Phenomena in the Bird Life of the Island of Juist in the North Sea, in the Winter of 1911–12. By Dr. E. Arends.

Ornithologische Monatsschrift. Vol. 39. No. 1. January, 1914.

Annual reports on the various protected bird colonies, with a number of excellent reproductions of photographs.

---

[1] cf. antea, p. 255.

Ornithologisches Jahrbuch. Vol. XXIV. Nos. 5, 6. October–December, 1913.

On the Ornithology of the Island of Corsica. By Dr. A. Laubmann (continued).

The Search for the Oystercatcher (*Hæmatopus niger*). By R. V. Thanner.— With notes on other birds of the Canaries.

Ornithological Observations in Sauerland [Germany]. By W. Hennemann.— Annotated list of 112 species.

Proceedings of the Bavarian Ornithological Society. Vol. XI. No. 4. December 5, 1913. (In German.)

On the Musical Pitch of Bird-song. By C. Schmitt and H. Stadler.

Parus bokharensis Licht and its Geographic Races in Turkestan. By A. Laubmann.

Description of two new Bird-forms from South-eastern Peru. By J. Graf Seilern.— *Capito tucinkæ*, and *Thamnophilus æthiops kapouni* both from Carabaya.

Spring and Autumn Migration at Bamberg [Germany] in 1912 and 1913. By A. Ries.

Two New Bird-forms from Trinidad. By C. E. Hellmayr and J. Graf Seilern.— *Vireo chivi vividior* and *Glaucis hirsuta insularum*.

Description of two new Neotropical Tanagers. By C. E. Hellmayr.— *Compsocoma somptuosa venezuelana*, Cumbre de Valencia Venezuela and *Atlapetes pallidinucha papallactæ*, Papallacta, E. Ecuador.

Revue Francaise d'Ornithologie. Vol. V. No. 56. December 7, 1913.

The Protection of Wild Animals in British East Africa. By G. Babault.

Revue Francaise d'Ornithologie. Vol. VI. No. 57. January 7, 1914.

Three Birds of New Caledonia on the Road to Extermination. By F. Sarasin.— *Rhinochetus jubatus*, *Tricholimnas lafresnayanus* and *Nymphicus uveaensis*.

On *Dryocopus eburneirostris* Lesson. By A. Menegaux.— Has been unable to locate the description in '*Echo du Monde Savant*,' where it was supposed to have appeared.

Song Birds in the Neighborhood of Vendome. By M. E. Coursimault.— Songs given in musical notation (continued in February).

Revue Francaise d'Ornithologie. Vol. VI. No. 58. February 7, 1914.

Notes on Birds Observed and Collected in Algeria. By Count Zedlitz.— To be continued, 36 species in this instalment.

Ardea. Vol. II. No. 4. December, 1913. (In Dutch.)

The Black Woodpecker (*Dryocopus martius*). By W. H. De Beaufort.

The Bittern (*Botaurus stellaris*). By A. Burdet.— With photographs of brooding bird.

Observations at the Lights of the 'Hoch van Holland.' By G. J. Van Oort.

Revista Italiana di Ornitologia. Vol. II. No. 4. April–June, 1913.

The Willow Warblers of Italy, especially *Phylloscopus tristis*. By T. Salvadori.

A Study of the Species of the Genus *Rhodophoneus*. By T. Salvadori.

Variation in the Plumage of *Coturnix coturnix* produced by an exclusively animal diet. By F. Cavazza.

Berajah. 1913. Text of Parus salicarius, pp. 1–4, and plates XI–XII, XV–XVIII.

Falco. IX. No. 1. January, 1914.

Comparison of two works of Prof. Martorelli, which Treat of *Falco feldeggi*. By C. Vallon.

Sarudny on the Blue-throats of Turkestan. By H. Grote.

Ornithological Articles in Other Journals.[1]

Seth-Smith, D. Hybrid between Peacock and Guinea-fowl, and between *Calophasis mikado* and *C. ellioti* (Abst. Proc. Zool. Soc. London. No. 127. February 10, 1914.)

Chamberlain, E. B. Local Fauna.— Seven records for Charleston, S. C. (Bull. Charleston Mus., IX, No. 8. December, 1913.)

Baxter, Evelyn V. and Rintoul, Leonora J. Two New Scottish Birds. (The Scottish Naturalist, No. 24, December, 1913.)— Melodious Warbler (*Hypolaius polyglotta*), and Indian Stonechat, (*Saxicola torquata indica*).

Clarke, W. Eagle. On Some Rare and Interesting Migratory Birds Observed at the Orcadian Island of Auskerry in the Autumn of 1913. (The Scottish Naturalist, No. 25, January, 1914.)

Best, May G. S., Turner, E. L., and Haviland, M. D. Notes on Bird-life in the Outer Hebrides as Observed During May and June, 1913. (The Scottish Naturalist, No. 26, February, 1914.)

Panton, H. Relationship of Species.— Relationship of bird genera as indicated by hybridization. (The Zoologist, No. 870 and 871, Dec. 15, 1913. Jan. 15, 1914.)

Warren, R. On Some Gulls Observed in Ireland — Iceland and Glaucous Gulls. (The Zoologist, No. 871, January 15, 1914.)

Jones, H. V. Parasitism in Relation to Birds. (The Zoologist, No. 872, Feb. 15, 1914.)

Stubbs, F. J. *Corophium longicorne*: An Ornithological Study of a Crustacean. (do.).— An interesting study of this erratic 'shrimp' and the numerous birds which fed on it at time of greatest abundance.

Selous, E. A Diary of Ornithological Observation made in Iceland During June and July, 1912 (do.).

Church, Sir A. H. Notes on Turacin and the Turacin Bearers. (Proc. Zool. Soc. London, 1913, pt. III, pp. 639–643.)— Turacin does not occur in *Dasylophus* as stated by Krukenberg but is restricted to the *Musophagidæ*.

---

[1] Some of these journals are received in exchange, others are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligations to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

Mitchell, P. Chalmers. Observations on the Anatomy of the Shoebill (*Balæniceps rex*) and Allied Birds. (do. pp. 644–703, 4 plates.)

Mitchell, P. Chalmers. The Peroneal Muscles in Birds. (do. pp. 1039–1072.)

Darwin, Horace. Migration Routes. (Nature, November 27, 1913.) Judging from experiences on aëroplanes he thinks birds follow rivers and coast lines by sight in the day time and by hearing at night. Ponds and rivers are not distinguishable from grass fields at night from an aëroplane except for the reflection of the moon.

Stanwood, Cordelia J. A Glimpse of the Winter Wren. (Nature and Culture, Vol. V, Nos. 9–10, Feb.–Mar., 1914.) — Study of nest and young.

Trowbridge, C. C. On the Origin of the Flocking Habit of Migratory Birds. (Pop. Sci. Monthly, March, 1914.) — Considers it due to the protection it offers, especially the 'echelon' formation by which every bird is able to see both forward and to one side.

Grieve, Symington. Notes upon some Rare New Zealand Birds, and Exhibition of Skins, Skeletons and Eggs. (Proc. Royal Phys. Soc. [Edinburg]. Vol. XIX, No. 4, pp. 63–78, 1913.) — Numerous interesting notes on the various species of *Apteryx* and list of specimens of *A. haasti*.

Macfie, J. Observations on two Tame Ravens and other Birds. (Glasgow Naturalist, V, No. 4, 1913, pp. 117–119.)

Paterson, J. The Return of Summer-Birds to the Clyde Orca in 1913. (do. No. 3, pp. 81–89.)

Anonymus. Birds. 1912–1913. (Annals of the Cyprus Nat. Hist. Soc.) — Notes on Birds of Cyprus.

Nichol, M. J. Some Notes on the Eggs of the Sudan Crowned Crane. (The Cairo Sci. Journ. Vol. VII, No. 86, November, 1913, p. 255.)

Jackson, Sir F. J. Notes on the Departure and Arrival of European and Asiatic Bird Migrants in Uganda, 1913. (Jour. E. Afr. and Uganda Nat. Hist. Soc., VI, No. 7, December, 1913, pp. 87–88.)

van Someren, V. G. L. *Ploceus interscupularis.* (do. p. 76.) — Full description of male and female, the latter hitherto unknown, with color plate.

Jackson, Sir. F. J. On Honey Guides. (do. p. 78.) — Apparently led hunter up to wild animals on two occasions.

Ogilvie-Grant, W. On a New Lark from the Cape Provence. (Ann. S. Afr. Mus. XIII, pt. 2, October 16, 1913.) — *Calandrella sclateri capensis.*

Poche, F. Supplement to C. O. Waterhouse's Index Zoologicus, No. II. (Zoöl. Annalen, VI, No. 1, pp. 33–42.) — Contains numerous bird genera but the ornithologist will find them all referred to 'Reptilia.' It would seem that in a list of this kind the convenience of maintaining the Class Aves would far outrank the importance of setting forth the author's views as to its claims as distinct from the Reptilia.

Paris, Paul. Researches on the Uropygian Gland in Birds. (Arch. Zool. Exper. et Gen. vol. 53, No. 4, 1913, pp. 139–276.)— In French.

Brother Alphonsus. Our Birds in the Spring of 1913. (Amer.

Midland Nat., January, 1914, pp. 201–206.) Birds of Summer, 1913, and Autumn, 1912. (do. p. 248–253, 243–247.)—Observations at Notre Dame, Indiana.

Vestal, A. G. An Associational Study of Illinois Sand Prairie. (Bull. Ill. State Lab. Nat. Hist., X, September, 1913, pp. 1–96, pll. I–V). Birds and Mammals briefly considered.

Butler, A. W. Notes on Indiana Birds. (Proc. Indiana Acad. Sci., 1912, pp. 53–65.)

Wamich, Paul. The Development of the Vertebræ of Birds. A Contribution to the Sauropsida Question. (Archiv. fur. Naturgesch., 1913, No. 6, pp. 1–34.) In German.

Hammling, Julius. Ornithological Observations and Notes from the Province of Posen [Germany] completed. (Zeitschrift. Naturwes. Arbeitl. XX, 1–6, pp. 1–97, 1913.) In German.

Varges-Lüneburg, Helme. List of Birds Observed in Lüneburg [Germany] in the years 1911–1913. (Jahresshefte des naturwis. Vereins. Lüneburg, XIX, 1910–13, pp. 83–96.) In German.

Lebedinsky, N. G. A Contribution to the Morphology and Development of the Bird's Pelvis. (Jenarsche Zeitschrift für Naturwiss., L, pt. 4, 1913, pp. 647–774.) In German.

Liebmann, Willy. The Protective Apparatus of Seeds and Fruit against the attack of Feeding Birds, Pt. II. (do. pp. 776–838.) In German.

Gyldenstolpe, Nils. Birds Collected by the Swedish Zoological Expedition to Siam, 1911–1912. (Kungl. Svenska. Vetensk. Akad. Handl. Vol. 50, No. 8, pp. 1–76, pl. I, 1913.) (In English.) — An Annotated list of 191 species with a zoogeographic and ecological consideration of the bird-life of Siam. *Criniger lönnbergi* from the dense evergreen forests of northern Siam and *Rubigula johnsoni* from Sakerat on the Korat plateau, are described as new.

Porter, C. E. Bibliography of the Ornithology of Chili. (Boletin del Museo Nacional. IV. No. 2, pp. 197–206, April–December, 1912.)

Rahmer, C. F. Contributions to the Ornithology of Chile. (do. pp. 207–209.) — Observations on *Molothrus bonariensis.* (In Spanish.)

Dabbene, Roberto. Distribution of Birds of Argentina according to the work of Lord Brabourne and Chubb 'The Birds of South America.' (Boletin de la Soc. Physis. [Buenos Aires]. I. No. 5, pp. 241–261, 1913.) The list contains as foot-notes many corrections to the author's 'Systematic Catalogue of the Birds of the Republic of Argentina.' (An. Mus. Nac. Buenos Ayers, 1910.) In Spanish.

Job, H. K. Notable Progress in Quail Propagation. (Forest and Stream, Dec. 20, 1913.)

Eaton, D. H. The Last Surviving Passenger Pigeon. (Forest and Stream, February 7, 1914.)—In the Cincinnati 'Zoo.'

Jewel, L. L. Canal Zone Bird Species. (The Canal Record, January 28, 1914.)—A nominal list of 251 species of Passeres and Hummingbirds.

Brabourne, Lord and **Chubb, Charles.** A Synopsis of the Genus

Tinamus. (Ann. and Mag. Nat. Hist. (8) XII, No. 72. December, 1913.) — Twelve forms representing six species are recognized from South America, of which *Tinamus tao septentrionalis* Cumana, Venezuela, and *T. robustus inexpectatus*, Salidero, N. Ecuador are described as new.

Ridewood, W. G. Guide to the Exhibition of Specimens Illustrating the Modification of the Structure of Animals in Relation to Flight. (Brit. Mus. Special Guide, No. 6. 1913.)

Eckardt, W. K. Practischer Vogelschutz. (Theodore Thomas, Leipzig.) (1913?) — A handbook of bird protection. (In German.)

Parkin, Thos. The Grey Friars, Winchelsea and its Rookery. (Hastings and East Sussex Naturalist, II, No. 2. August 14, 1913.) — An interesting illustrated article on the Rooks, picturing the large nests built in colonies. This is a continuation of a series of papers in Vol. I of the same journal on Heronries and Rookeries of East Sussex.

Horring, R. Birds Observed at the Danish Lights in 1912. (Videnskab. Meddel. fra Dansk naturhist. Forening i Kjobenhavn. Bind 65. 1913.) In Danish.

Publications Received.— **Baker,** E. C. Stuart. Indian Pigeons and Doves. Roy. 8vo. pp. i–xv + 1–260, pll. 1–26 + frontispiece, all colored. London, Witherby & Co., 1913. £2. 10s. net.

Bannerman, David A. An Ornithological Expedition to the Eastern Canary Islands — Part 1. (The Ibis, 1914, pp. 38–90.)

Bonhote, J. Lewis. Practical Bird Keeping. 8vo. pp. i–xvi + 1–142, pll. I–XVI + colored frontispiece. London, West, Newman & Co. 1913.

Bryant, Harold C. A Determination of the Economic Status of the Western Meadowlark (*Sturnella neglecta*) in California (Univ. of Cal. Publ. in Zool. 11, No. 14, pp. 377–510, pll. 21–24. 5 text figs., Feb. 27, 1914.)

Bunker, C. D. The Birds of Kansas. (The Kansas University Science Bulletin, VII, No. 5, June, 1913, pp. 137–158).

Christy, Miller. Birds-nesting and Bird-skinning. 8vo. pp. 1–138. London, T. Fisher Unwin. 1888.

Dalgliesh, Gordon. Familiar Indian Birds. Second edition. 8vo. pp. 1–90. London, West Newman & Co. 1909.

Elms, E. F. M. Pocket Book of British Birds. 8vo. pp. i–viii + 1–150. London, West Newman & Co. 1906.

Fleming, James H. Birds of Toronto, Ontario. Reprinted and repaged from The Natural History of the Toronto Region. 1913. 8vo. pp. 1–26.

Forbush, Edward Howe. Fifth Annual Report of the State Ornithologist of Massachusetts. Reprinted and repaged from the Sixteenth Annual Report of the State Board of Agriculture. pp. 1–34, pll. 1–6. Boston, 1913.

Grinnell, Joseph. A Second List of the Birds of the Berkeley Campus. (The Condor, XVI, January 20, 1914, pp. 28–40.)

Hellmayr, C. E. (1) Critical Notes on the Types of Little Known Species of Neotropical Birds, Part II. (Novitates Zoologicae, XX, Febru-

ary, 1913.) (2) Description of two New Birds from the Timor Group of Islands. (do., December, 1912). (3) Die Avifauna von Timor. (Zool. von Timor, I. Lieferung, Stuttgart, 1914.)

Keezel, Clara C. Bird Study Note Book. Published by the author. Garnett, Kansas. 1913. 27 cts., postpaid.

McAtee, W. L. Five Important Wild-Duck Foods. (Bull. U. S. Dept. Agr. No. 58, February 7, 1914.)

Mathews, Gregory M. The Birds of Australia. Vol. III, Part 4. 4°. pp. 301–380, pll. 167–177. London, Witherby & Co. December 31, 1913.

Mearns, Edgar A. (1) Descriptions of Ten New African Birds of the Genera Pogonocichla, Cossypha, Bradypterus, Sylvietta, Melaniparus, and Zosterops. (Smithson. Misc. Coll., Vol. 61, No. 20. November 29, 1913.) (2) Descriptions of Eight New African Bulbuls. (do. No. 25. February 16, 1914. [Reced. March 11, 1914].)

Mullens, W. H. I. Guide to Selborne. II. Synopsis of the Life of Gilbert White. (Bull. Brit. Ornith. Club, No. CXC, pp. 1–27.) London, Witherby & Co. 2s. 6 net.

Phillips, John C. (1) Two New African Birds. (Proc. Biol. Soc. Wash., XXVI, pp. 167–168, June 30, 1913.) (2). Notes on a Collection of Birds from the Sudan. (Bull. Mus. Comp. Zool., LVIII, No. 1, pp. 1–27, December, 1913). (3) Reciprocal Crosses between Reeve's Pheasant and the common Ring-neck Pheasant Producing Unlike Hybrids. (Amer. Nat., XLVII. November, 1913.)

Reichenow, Anton. Die Vögel. Handbuch der systematischen Ornithologie. 1. Band. Roy 8vo. pp. 1–529, fgg. 1–185, pl. 1. Stuttgart. Ferdinand Enke. 1913. M. 15.

Shufeldt, R. W. (1) Use of Material by Young Nature Students. (Nature Study Review. 10, No. 2. February, 1914, pp. 49–53.) (2) Some American Wild Fowl, Part I. (The Guide to Nature, VI, No. 8, December, 1913, pp. 202–205. (3) do. Part II. (do. VI, No. 9, January, 1914, pp. 227–229). (4) Extinct Ostrich Birds of the United States. (Aquila, 1913, pp. 411–422, pll. I–V.)

Swales, Bradshaw H. A Critique of Barrow's "Michigan Bird Life." Reprinted and repaged from The Wilson Bulletin. March, 1913. pp. 1–12.

Swarth, Harry, S. (1) A Revision of the California Forms of *Pipilo maculatus* Swainson, with Descriptions of a New Subspecies. (The Condor, XV, pp. 167–175. September, 1913). (2) A Study of a Collection of Geese of the *Branta canadensis* Group from the San Joaquin Valley. California. (Univ. of Cal. Publ. in Zool., 12, No. 1, pp. 1–24, pll. 1–2, 8 text figs. November 20, 1913.)

Lechner, A. A. Van Pelt. "Oologia Neerlandica." Eggs of Birds Breeding in the Netherlands. Pts. IV–VII. January, August and November, 1913. February, 1914. Small 4°. The Hague, Martinus Nijhoff. Price, £1. 1s. per part net.

Stanwood, Cordelia J. Winter Wren (Nature and Culture, Vol. V, No. 9–10. March, 1913).

Abstract Proc. Zool. Soc. London, Nos. 126, 127, December 2, 1913, February 10, 1914.

American Bird-House Journal, The, II, No. 1, January, 1914.

American Field, The, LXXXI, No. 5, January 31, 1914.

Ardea, II, No. 4, December, 1913.

Austral Avian Record, II, No. 4, December 29, 1913.

Avicultural Magazine, (3) V, Nos. 2, 3, 4 and 5, December, 1913–March, 1914.

Bird Lore, XVI, No. 1, January–February, 1914.

Bird Notes and News, V, Nos. 5, 6, 7, 8, 1913.

Boletim do Museu Goeldi, Vol. VII (1910), 1913.

British Birds, VII, Nos. 7, 8, 9, 10, December, 1913–March, 1914.

Bulletin Brit. Ornith. Club, Nos. CXCII–CXCIV, November 27, and December 23, 1913 and January 29, 1914.

Bulletin Charleston Museum, IX, No. 8, December, 1913, and X, No. 1, 2, January and February, 1914.

Condor, The, XV, No. 6, November–December, 1913, XVI, No. 1, January–February, 1914.

Forest and Stream, LXXXI, No. 26–LXXXII, Nos. 1–12.

Ibis, The, (10) II, No. 1, January, 1914.

New Jersey and Pennsylvania Audubon Bulletin, No. 3, December 1, 1913.

Oölogist, The, XXX, No. 12, December, 1913, XXXI, Nos. 1, 2, January, February, 1914.

Oregon, Sportsman, The, I, No. 4, December, 1913.

Ornithologische Monatsschrift, 38, Nos. 11, 12, November–December, 1913; 39, No. 1, January, 1914.

Ornithologisches Jahrbuch, XXIV, Nos. 5–6, October–December, 1913 (Dec. 23, 1913).

Ottawa Naturalist, The, XXVII, Nos. 9, 10, 11, December, 1913–February, 1914.

Outing, LXIII, No. 5, February, 1914.

Philippine Journal of Science, The, VIII, No. 4, August, 1913.

Proceedings, Acad. Nat. Sci. Phila., LXV. Pt. III. September–December, 1913.

Records of the Australian Museum, IX, No. 4, X, Nos. 6, 7, Oct. 24, Oct. 10, and Dec. 19, 1913.

Revue Francaise d'Ornithologie, V, No. 56, December, 1913, VI, Nos. 57–58, January–February, 1914.

Science, N. S. XXXVIII, No. 991–XXXIX, No. 1003.

Scottish Naturalist, The, 1913, No. 24, December, 1913, Nos. 25, 26, 27; January–March, 1914.

South Australian Ornithologist, The, I, No. 1, January, 1914.

Verhandlungen Ornith. Gesellsch. Bayern, XI, No. 4, December, 1913.

University of California, Annual Report, January 24, 1914.
University of Michigan Museum, Report of Director, November, 1913.
Wilson Bulletin, XXV, No. 4, December, 1913.
Zoölogist, The, (4), XVII, Nos. 204, 205 and 206. December, 1913–February, 1914.

CORRESPONDENCE.

The Gannets of Bonaventure.

EDITOR OF 'THE AUK,' SIR:

With reference to your review of 'The Gannet, a Bird with a History,' may I use your columns to make a request for more information about the early history of the important Gannet settlement upon Bonaventure Island, which lies some way to the south of Cape Gaspé in the Gulf of St. Lawrence? I learn from Mr. F. A. Lucas that in 1813, Commander Wakeham of the cruiser 'Princess,' was in the vicinity of Bonaventure, on which he did not land, but understood that the Gannets had been established there a long time. But one would like to have some definite written information about them, and proof of their presence on the island, not only in 1813, but at a much earlier date, which ought to be obtainable. Unfortunately neither Audubon nor Dr. Henry Bryant went to Bonaventure, nor does there appear to be a record of any naturalist having actually been there before 1881, in the summer of which year it was visited by Mr. William Brewster and Professor Hyatt, who were members of a small party organized by The Boston Society of Natural History for scientific exploration. Mr. Brewster did not actually land on Bonaventure, but great numbers of Gannets were flying about when he sailed past it, although the weather was too misty to permit of a good view of the cliffs.

J. H. GURNEY.

Keswick Hall, Norwich.

Researches of Gerhard Heilmann on the Origin of Birds.

EDITOR OF 'THE AUK':

Last autumn my attention was called to the unusual and very excellent work now being published by the Danish ornithologist, Mr. Gerhard Heilmann, of Copenhagen. Through my correspondence with this painstaking researcher, it came about that I was in a position to be of some slight

service to him in this country in securing the data of literature and other material.

Mr. Heilmann still stands in need of some similar assistance, a part of which I have been unable to secure for him in Washington. The literature gives no trouble as we have large libraries here; but I should very much like to borrow, for short periods of time and for the purpose of making photographs, some of the following specimens, namely, (1) a good example of a nestling Hoatzin (*Opisthocomus cristatus*) in alcohol; (2) specimens, also in alcohol, of the male reproductive organs of any of the ratite birds but especially of the common ostrich; (3) microscopic slides of the spermatozoa of any of the *Ratitæ* or of reptiles; (4) alcoholic specimens of anything showing the *pecten* of the eye in birds or reptiles, and (5) any other specimens along similar lines. For the loan of such material I will be glad to meet the expense both ways, and full credit will be given to the individual or institution loaning it in Mr. Heilmann's forthcoming work, which is now in hand and in part published.

This work has the general title of "Our present knowledge in regard to the origin of Birds," and is published in Danish in *The Journal of the Ornithological Society of Denmark* (Copenhagen). It is profusely illustrated by drawings made by the author and selected from the works of other authorities on the subject. Parts I and II have already appeared, the first in Hæfte I and II, Vol. 7, Jan. 1913, and the second in Hæfte I and II, Vol. 8, Oct., 1913. There is an excellent introduction to these researches in Part I, wherein the contributions of Lütken, Huxley, Balfour, and others are quoted and compared. Chapter I is a classic in itself, for all the early bird-forms are compared and beautifully figured, such as *Archæopteryx*, *Hesperornis*, *Phororhacus*, *Pachyornis*, and numerous others, full credit being given to Marsh, Owen, Dames, Brehm, Sternberg, and others.

Part II is a remarkable production, treating, as it does, of the "Resemblances between *Aves* and ancient or prehistoric Reptiles." The figures are extremely interesting, and the labors of Cope, Cuvier, and many other authorities are compared. In Section II of this chapter, wherein the principal species of Dinosaurs are taken up, Mr. Heilmann gives us some of his own very clever restorations, and the works of Dollo, Pycraft, and many others are reviewed and compared in commendable detail.

An almost unique feature of the work, as thus far published, is the comparison of the modes of locomotion in birds and reptiles, existing and extinct. Here the admirable studies of Saville Kent and others come into play with striking examples to illustrate the author's views. Work of Americans in these fields is used with good effect, as the contributions by Schuchert, Lull, Eaton, Osborn, and others.

Mr. Heilmann intends to complete this work in five Parts; the next Part (III) will be devoted to comparative embryology; Part IV, to the Anatomy and Biology of *Aves* and *Reptilia*, and, finally, Part V, to a recapitulation and summing up of conclusions. Mr. Heilmann has extended to me the right to bring this work out in English; and should my time admit of it,

after the Parts have all appeared, I trust to be able to do so. In the meantime, however, I hope our application for assistance in the matter of material, as set forth in this letter, will result in obtaining in this country what has been asked for above.

Faithfully yours,

R. W. SHUFELDT.

3356–18th Street, Washington, D. C.
January 8th, 1914.

NOTES AND NEWS.

THE feeling at the present moment against the traffic in wild bird plumage is stronger and more widespread than ever before. Following the lead of the United States, England has a bill in Parliament prohibiting the importation of plumage, and from practically all other countries come letters endorsing this stand. Quoting from the winter number of 'Bird Notes and News' we find the following from Prof. C. G. Schillings, the distinguished German naturalist: "The United States has found the only satisfactory solution of this question. Only direct prohibition will reach the core of the matter. . . . We German friends of nature and of the birds only wait anxiously that England, too, may get its Feather Importation law. We certainly will follow. If Australia, North America, England and Germany close the market, the trade will die out."

'German Fashion' for October 26, 1913, says: "Thanks to the prohibition of import into America and the coming Plumage Bill in England, the end is at hand of the use of the Egret in fashionable Millinery."

In a discussion at the Academy of Sciences at Paris, M. Perrier, Director of the Natural History Museum, protested strongly against the destruction of birds. He begged the Academy to decline the trade offer of $2000 for the best method of domesticating egrets in farms. It was a mere blind, he said, to gain time and divert attention; everyone knew that these birds could not be domesticated.

In Holland Professor Swaen states that steps are being taken to prepare the public for a favorable reception of a bill to prohibit importation of wild bird plumage, and similar statements and letters of approval come from Denmark, Austria and Switzerland.

The direct effect of the American tariff prohibition is shown with great clearness when one studies the catalogues of the London feather auctions. In the 'N. Y. Zoological Society Bulletin' for January, Dr. Wm. T. Hornaday states that "exactly ten days from the signing of our tariff law by

President Wilson, the London feather market suffered a tremendous decline. Out of 1174 lots that were offered 368 had to be withdrawn because of bad prices and no buyers."

Among the lots that had to be withdrawn in consequence of the closing of the American market he cites: 1203 Greater Birds of Paradise, 22810 Kingfishes, 761 Emu, 3381 Pheasants, 54076 wing and tail quills of Condors, Hawks and Eagles, and 2494 ounces of Egret plumes (=to about 14,964 birds).

With the broadening of ornithological study, the student of birds is brought more than ever to a consideration of various questions bearing upon evolution — the inheritance of characters, relation of color patterns to environment, meaning and origin of secondary sexual characters, etc. Birds were favorite subjects with both Darwin and Wallace for study in connection with the theories of both natural and sexual selection and are admirably adapted for the purpose, as well as for the study of other allied problems.

The ornithologist of today cannot however afford to base his studies exclusively upon external conditions and to ignore the wonderful advances that have been made in recent years in the study of cells, especially of germ cells, which have placed the whole problem not only of heredity but of sex in an entirely new light. The enlightening experiments in breeding which have often corroborated the theories that originated in cell study must also demand his attention.

The study of the bird in relation to its environment is as important as ever but the student must at the same time be familiar with the results achieved in this new line of investigation.

It is often difficult for one to take up a subject of this kind and follow its development through a voluminous and widely scattered literature, but in this instance we have the whole subject clearly and concisely set forth in a little volume by Dr. Thomas H. Morgan, 'Heredity and Sex,'[1] one of the series of Columbia University Lectures. 'The Evolution of Sex,' 'The Mendelian Principles of Heredity,' 'Secondary Sexual Characters,' 'Parthenogenesis' and 'Sex-linked Characters,' are some of the topics discussed. Birds are constantly referred to and the work while hardly to be classed as strictly ornithological literature is one well worthy of the ornithologist's attention.

The first of the proposed annual meetings of the Wilson Ornithological Club was held in Chicago on February 5 and 6, 1914, and plans were formulated for similar yearly gatherings at points in the middle section of the country. For an initial gathering it was well attended and the business done will mean much for the cause of ornithology throughout the region which the Club especially covers. Such a movement will, we feel

[1] Columbia University Press. New York, 1913. 8vo. pp. 1–282.

sure, prove of immense benefit to the A. O. U. and will pave the way for a meeting of the latter body in Chicago or vicinity some time in the near future.

THE Delaware Valley Ornithological Club held its twenty-fourth annual meeting on the evening of January 14, 1914, at the Academy of Natural Sciences, Philadelphia. The following officers were chosen for the ensuing year, President, Stewardson Brown; Vice-President, Henry W. Fowler; Secretary, J. Fletcher Street; Treasurer, Samuel C. Palmer; Editor of 'Cassinia,' Robert Thomas Moore. The meetings have been well attended during the year and a number of interesting communications have been made. Among others may be mentioned the 'Musical versus the Syllabic Method of Recording Bird Song,' by R. T. Moore; 'The Embryology of a Bird,' by Dr. Samuel C. Palmer; 'Notes on Birds Observed on a Trip through Florida and Texas,' by James A. G. Rehn, 'On Kirtland's Warbler in Michigan' by Dr. Max M. Peet, and 'Fish-eating Birds,' by Henry W. Fowler.

The Club is preparing to increase its corps of bird migration observers and will be glad to furnish blank schedules for making returns to anyone in eastern Pennsylvania or southern New Jersey who desires to aid in the work.

THE Linnæan Society of New York, held its annual dinner at the Hotel Endicott, New York City, on the evening of March 24, 1914. Dr. Daniel Giraud Elliot was the guest of honor.

THE coming Thirty-second Stated Meeting of the A. O. U. to be held at Washington, D. C., April 6–9, 1914, marks a new policy on the part of the organization. The first and second meetings were held in September, the fifth in October, and several early in December, but all the others in November, usually during the second week in the month.

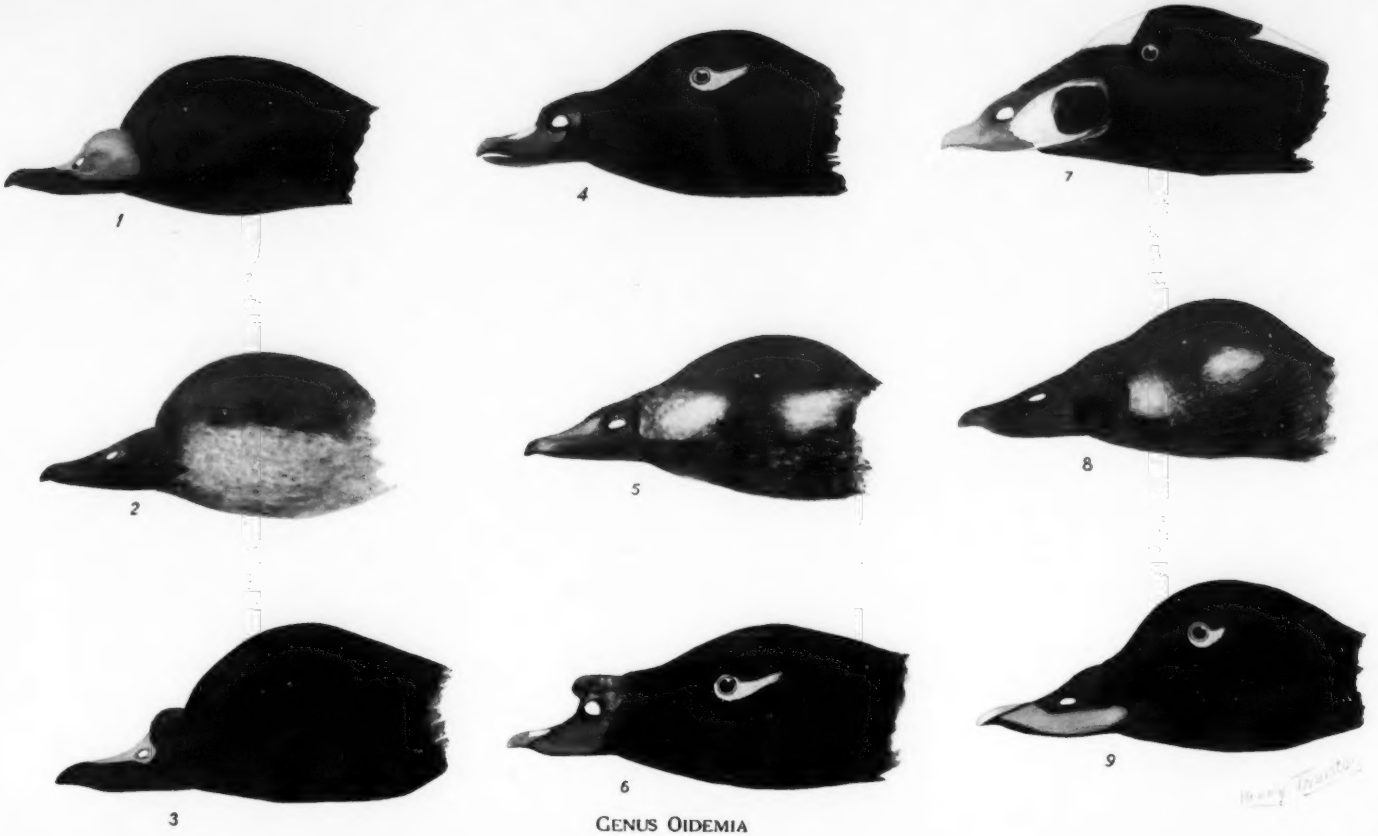
The objects of the change to April were explained in the January issue of 'The Auk' and it is to be hoped that many members who were hitherto unable to be present will this year find it possible to attend, and also that the change from autumn to spring will not prove inconvenient to those who through many years' attendance have become thoroughly identified with the meetings.

The circular issued by the local committee states that an invitation has been received from Dr. Frank Baker inviting the members to visit the National Zoölogical Park, a delightful spot where in April many wild native migrant birds may doubtless be seen as well as the foreign species which are, from force of circumstances, resident there. Further possibilities in this direction are opened up by the additional announcement that if weather conditions will permit there will be short field excursions under

the guidance of local members, and "it is recommended that walking shoes be included in the baggage."

If this spring meeting proves the success that we hope it may, there is no reason why the field trips may not eventually become as important a part of the program as in the case of the Royal Australasian Ornithologists' Union, where regular 'camp outs' are held after the meeting and observations of much importance are made.

At any rate let us urge every member of the Union to make a point of being in Washington on April 7, prepared to help make this the best meeting that the A. O. U. has held.



GENUS OIDEMIA

1. O. AMERICANA, ♂ AD.
2. O. AMERICANA, ♂ JUV.
3. O. NIGRA, ♂ AD.
4. O. DEGLANDI, ♂ AD.
5. O. DEGLANDI, ♂ JUV
6. O. CARBO ♂ AD.
7. O. PERSPICILLATA, ♂ AD.
8. O. PERSPICILLATA, ♂ JUV.
9. O. FUSCA, ♂ AD.